CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

MINES BRANCH
INDUSTRIAL MINERALS DIVISION

INDUSTRIAL WATER RESOURCES OF CANADA

Water Survey Report No. 2

Ottawa River Drainage Basin, 1947-48

By

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INDUSTRIAL WATER RESOURCES OF CANADA

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INTRODUCTION

The continuous study of waters available for industrial use is of great importance to industry and to civic authorities. The information thus obtained is of special importance in the establishment of new industries, to the new and expanding municipal centres, and for many other reasons.[1]

A survey of the chemical quality of water supplies available for industrial and related uses in Canada was started in 1934. It was limited in scope and was discontinued in 1943, but was renewed late in 1946. The results of this survey over the period 1934 to 1943 appear in Bureau of Mines[2] Report No. 819, which, owing to the large demand, is now out of print. The studies on water quality under way since 1946 are on a broader and more detailed scale so that the data obtained will have a wider application.

The present report is the second in a series that will, it is hoped, provide further data on the availability and character of Canadian water supplies. It is intended to issue additional reports, each covering one major drainage basin.

Water Survey Report No. 1 gives in some detail the methods of sampling and analyses used in the investigation and outlines the aims and scope of the survey. Some discussion is also presented to assist the reader in the interpretation of the analytical data given in the various reports.

The Dominion-wide survey of the chemical quality of waters available in Canada for industrial and municipal uses was begun on the Ottawa River drainage basin. As a preliminary study, and in some measure to determine the scope and procedure for future work, investigations were begun in December 1946 on the seasonal variation in waters available in rivers at Ottawa, Ontario. This study is reported in some detail in Part I, pages 9 to 25, which tabulates the results of weekly sampling at four locations for a period of seven or eight months.

In the spring of 1947 a program of sampling at key stations throughout the Ottawa River drainage basin was started, monthly samples being obtained at most stations for the period of May 1947 to May 1948. During the summer of 1947 this watershed was travelled with a mobile laboratory and additional samples of surface waters were obtained, field testing being carried out immediately on sampling. This work is reported in detail in Part II, pages 26 to 75.

Part III reports the results of studies on the municipal water supplies within this drainage basin. Most of these civic samples were collected by the writer while engaged in field studies during the summer of 1947, but a few localities were not visited until 1949. Water samples from other localities were obtained from municipal officials. Wherever possible the data given regarding operation of civic water systems include population served, source of supply, treatment carried out, storage capacity, average water consumption, and major industries served.

Chemical analyses are reported in detail on all waters and include the results of field tests whenever available. As work on this watershed was done during a period when procedures in the field and in the laboratory were being standardized, there is some change both in the analytical method used and in the number of tests carried out at different times. No attempt is made to interpret or assess in detail all the information recorded in this report. Particular studies, such as the effect of storage and the correlation of certain values, will, if of sufficient interest, be reported at some future date in separate papers.

Tables, graphs, and maps are included to assist in locating the various sampling stations and to clarify the data presented.

SURVEY PROCEDURE

The general procedure for the collection and analyses of waters is given in detail in Water Survey Report No. 1 (Mines Branch Report No. 833).

The sampling procedure followed in the studies reported below has proved fairly satisfactory and is essentially the same as that used in subsequent work. A number of key stations on the main river and its larger tributaries were chosen with due regard to the representative nature of the sample obtained, ease of sampling, ice conditions,

[1] Water Survey Report No. 1: Scope, Procedure, and Interpretation of Survey Studies; Report No. 833, Mines Branch, Dept. of Mines and Technical Surveys, Ottawa.

[2] Now Mines Branch.

and availability of facilities for express shipment of samples. Monthly samples were obtained from these stations generally for a period of one year, and whenever possible samples were obtained from the river at high and low level.

With due consideration to other factors, sampling stations were usually located at points where river flows were available, and gauge readers acted as collectors of the samples. At many other points municipal officials took the samples direct from their intake wells or pumps.

For studies in the field a small truck fitted as a mobile laboratory was used. Except for the preliminary studies near Ottawa and those few localities not visited, the spot surface-water samples and samples from municipal supplies were taken by the writer in the field, and tests for temperature, pH, colour, turbidity, and alkalinity were made immediately in the mobile laboratory. In many cases tests for chlorides, soap-consuming power, soluble silica, etc., were carried out also at the time of sampling, but these are not generally reported. To some extent the field tests were made to determine their value as compared with standard laboratory methods. Tests, such as for pH, colour, turbidity, and alkalinity, were made in the field to study the effects of storage in glass containers, as these values were again determined later in the laboratory.

This preliminary work and various studies since have clearly demonstrated the importance of rapid analysis of most water samples. Storage for any length of time in glass appears to have a much greater effect on certain values than is often recognized. Initial lack of personnel and changes in personnel unavoidably resulted in long storage of many of the samples herein reported and the fact that all waters do not show storage changes to the same extent made it difficult to interpret the subsequent analyses of the samples.

The effect of storage will be discussed in more detail in a future report, when more studies on the subject have been concluded. So far it has been noted that the effect is most marked on ground waters and on waters high in bicarbonate and containing appreciable free carbon dioxide. There seems to be no definite rule regarding the effect, as some waters may show by analysis no appreciable change over a long period, whereas others change in a relatively short time, although, generally, storage for short periods causes no marked change. The effects of storage in light and the presence of micro-organisms are often very important. Changes noted, aside from heavy growth of algae at times, are in pH, colour, and alkalinity with, in some cases, marked loss of calcium from solution, as a calcium carbonate ($CaCO_3$) precipitate.

Storage time has been reported in the analyses below. This will be standard practice in all future reports, as it is believed to be a factor of some importance when interpreting water analyses.

ANALYTICAL PROCEDURE

Details regarding the methods of analyses used in these studies are outlined in Water Survey Report No. 1.

Owing to the preliminary nature of the studies herein reported, and for other reasons, changes in analytical and test procedure were made from time to time during the period covered. Following previous practice by the Water Analysis laboratory, testing at the beginning of the investigation was carried out on the water as received, that is, the sample was shaken and portions taken for testing. For purposes of statistical analysis and interpretation of the results, this procedure was considered unsatisfactory and has since been changed, partly as a result of the work reported in Part I.

As long as the water has low turbidity it is believed to be immaterial whether it is tested after shaking, or whether the supernatant water or a filtered sample is tested. However, when appreciable turbidity is present values obtained for iron, calcium, magnesium, silica, etc., may include in part these minerals present in the water as colloidal or finely suspended matter. It will be noted that the waters of the Ottawa River watershed generally have low turbidities and errors due to suspended matter are therefore low, though in some samples that do show appreciable turbidity any comparison of analyses must take into account this possible error. Similarly, municipal supplies are generally clear and in these also this error is not appreciable.

Therefore, when considering the data presented below, it is necessary to keep in mind the error due to analysis or partial analysis of sediment or colloidal matter in turbid waters. Silica determined gravimetrically includes the silica in the suspended matter if this is appreciable. Later in the survey silica was determined colorimetrically and has been reported. Similarly, sulphate ion and cations such as calcium and magnesium may be included when present in the suspended matter.

In the early work the iron reported is the total iron in the water and in the sediment, if any is present. In later work both total and soluble iron are reported wherever the turbidity of the water was greater than 3 p.p.m. or iron has precipitated.

Residue on evaporation can be compared with the sum of constituents—dissolved solids found by analysis—only in those cases where there is no appreciable turbidity or sediment.

Alkalis were initially determined gravimetrically and reported as sodium. Later the flame photometer was used and both potassium and sodium are reported.

The values reported below are actually those determined by analysis even though it is recognized that in many cases the accuracy of the determination is not such as is indicated by the number of significant figures reported. The significance and accuracy of various determinations are discussed in Water Survey Report No. 1.

SUMMARY

The preliminary study, Part I, served several useful purposes, as follows:

(1) It supplied detailed information on the major rivers at Ottawa and their expected yearly variation.

(2) It indicated that future studies on most Canadian rivers (except those that are of special interest, are heavily contaminated, or are high in solids and have rapid flow changes) may be carried out by having samples taken at monthly periods and if possible, also, at high and low water to indicate general seasonal variations. However, daily sampling would be preferable.

(3) It indicated a number of problems and minor sources of error regarding procedure and analyses, most of which have since been corrected or are under study.

This study also led to the following conclusions:

(i) Flow records are of value in studying the quality of water, though from this limited data it does not appear possible to definitely correlate the analysis with the flow at any particular time.

(ii) Storage and pretreatment of samples are most important. Certain tests should be made at time of sampling.

(iii) Contamination as shown by chloride and nitrite contents in the Ottawa River below Ottawa, at least on the Quebec side, is not great.

Parts II and III tend to confirm many of the findings noted in the preliminary study, and also show that:

(1) Ottawa River and its tributaries—except for a few small streams entering from the west, near Ottawa, and from the northern clay belt—are characteristically highly coloured with low total mineral content, generally low in turbidity, and soft.

(2) Except for their high colour, these waters usually require little treatment to make them satisfactory for domestic use and for many industrial uses. Consequently, if users are not dissatisfied with some coloration and, for very short periods, turbidity, treatment other than chlorination is not necessary, and any further treatment would be to remove such colour.

(3) Industries and municipalities within the Ottawa River watershed have, in the main, a sufficient quantity of surface water that can be used without excessive treatment, and in certain areas with no treatment. It is, therefore, not surprising to find such a large percentage of the population using the rivers and lakes of this watershed.

(4) In only a few areas where accessibility to the surface waters of the basin is difficult, or where the character of the land drained and deforestation has affected the rivers, is there hard water or any major problem. This is particularly evident in the clay belt of northern Ontario and Quebec. In many cases where hard and otherwise unsuitable waters are used at present, adequate softer surface supplies can be obtained with no difficulty other than the increased cost of piping and pumping.

(5) Thus the condition of civic supplies in the watershed for all uses other than potability can be generally classified as good. The amount of treatment necessary for many uses is very small.

The above conditions will continue only if deforestation and pollution of the watershed is prevented and if means are taken to protect the quality of the water as population and industrial activity within the area increases. At present, waste disposal to the river appears to be counter-balanced in many cases by the adequate flow of a relatively pure water from heavily wooded, sparsely populated areas.

The choice for industrial sites within this drainage basin is quite wide, because so much of the area is served by the same general quality of water. There is no reason to expect that industrial expansion within the watershed will give rise to water problems provided careful consideration is given to location of plants and the watershed is maintained in its present condition.

ACKNOWLEDGMENTS

Acknowledgment is made to the staff of the Water Analysis laboratory, Mines Branch, under the supervision of W. R. Inman, for the laboratory analyses of the samples reported, and to the Dominion Water and Power Bureau (now the Water Resources Division, Department of Resources and Development) for co-operation in supplying flow records on the rivers. In many cases gauge readers of the Water Resources Division acted as collectors of the water samples.

The courtesy and co-operation of municipal and public utilities officials in supplying data on their systems to the writer during visits to their localities, or by correspondence, is also gratefully acknowledged.

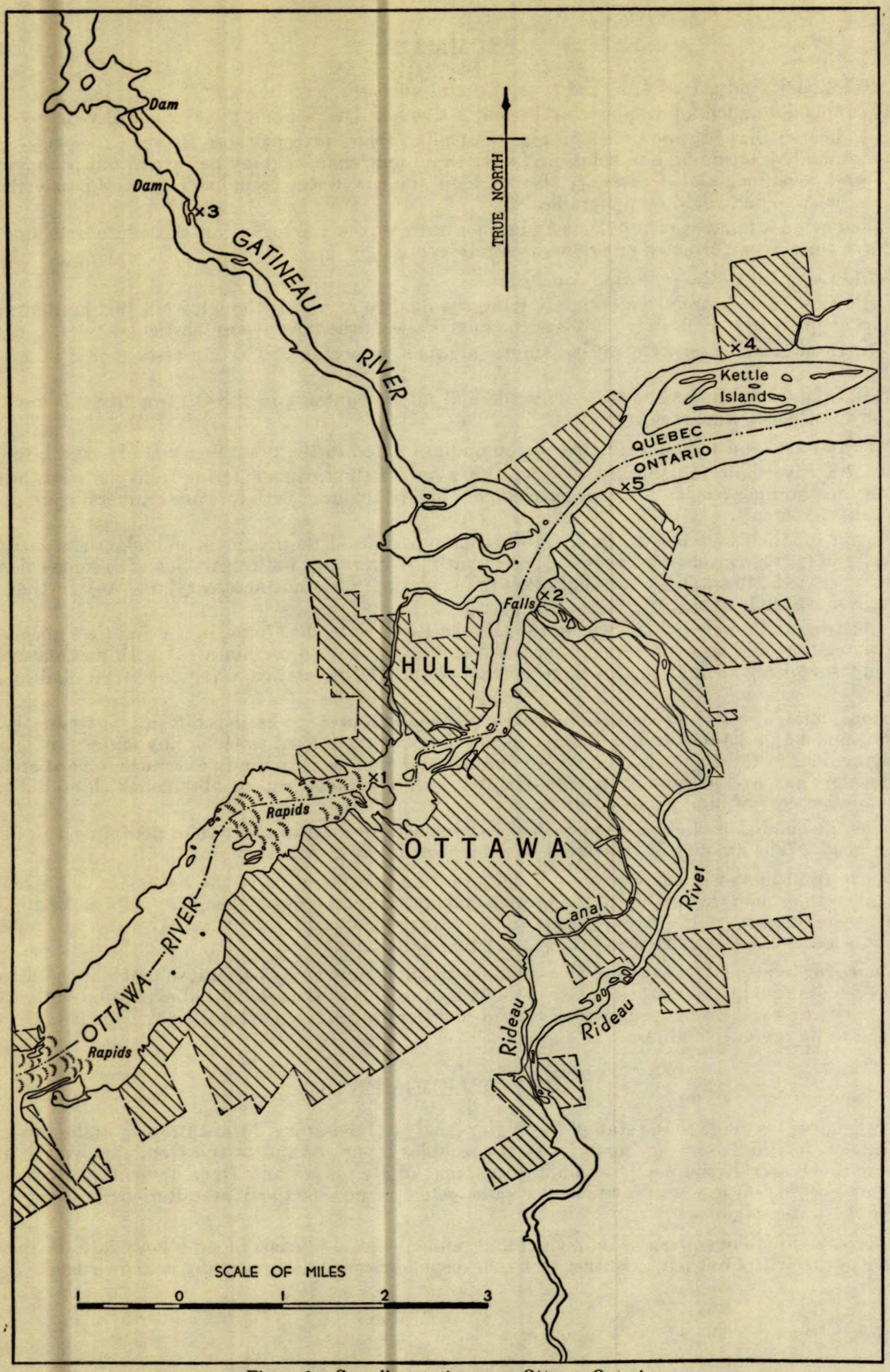

Figure 1. Sampling stations near Ottawa, Ontario

PART I

PRELIMINARY STUDIES ON QUALITY OF SURFACE WATERS AT OTTAWA

At Ottawa, which is separated from Hull, Quebec, by Ottawa River, two major tributaries enter the main river. Rideau River, draining an area of flat clay land, enters the Ottawa about three-quarters of a mile above and opposite Gatineau River, which drains a large area of the Laurentian Highlands north of Ottawa River. No major tributary enters the Ottawa above these rivers until about 35 miles upstream, Mississippi River enters from the southwest or Ontario side, and Quyon River from the Quebec side.

About four or five miles above the city of Ottawa, the Ottawa River widens out into a natural reservoir, Lake Deschênes, below which are the Chaudière rapids about 3 miles above the mouth of Rideau River. Kettle Island splits Ottawa River about $1\frac{1}{4}$ miles below the entrance of Gatineau River.

Sampling stations were of necessity chosen at locations accessible throughout the year and where the river would be free of ice. These sampling points are shown in Figure 1 and were as follows:

Station No. 1 was on Ottawa River above the confluence of Rideau River, at the forebay to the city's filtration plant on Lemieux Island. This point is just below the Chaudière rapids and above any major industrial development. Most of the samples were taken at depths of 2 to 3 feet, just offshore, in relatively fast water.

Station No. 2 was at the mouth of Rideau River where it falls into the Ottawa. Samples were taken in front of the gate screens of the Ottawa Electric power plant in fast water at a depth of about 4 feet. Here the river has already passed through the city and some industrial and domestic pollution probably occurs.

Station No. 3 was on Gatineau River at the Gatineau Power Company plant at Farmers' Rapids about $5\frac{1}{2}$ miles upstream from the mouth of the river. Samples were taken before the gate screens at this plant at a depth of about 4 to 5 feet. There is no industrial development or major tributary inflow for a considerable distance upstream. However, the forebay of this plant and other power plants upstream do act to some extent as natural mixing and settling basins.

Station No. 4 was at the screens to the water-treatment plant of Canadian International Paper Company, Limited, at Gatineau Mills on Ottawa River, about $2\frac{3}{4}$ miles below the mouth of Gatineau River. The flow here is rapid and is representative of Ottawa River water on the north side of Kettle Island. Between this point and Station No. 1 are the cities of Ottawa and Hull with considerable industrial development, including two pulp and paper mills in Hull, on the same side of the river.

Station No 5 was at the dock of the New Edinburgh Canoe Club on the Ontario side of Ottawa River, $\frac{3}{4}$ mile below and opposite the mouth of Gatineau River and $1\frac{1}{2}$ miles below the mouth of Rideau River. This point is downstream from the city of Ottawa but slightly above Kettle Island. Sampling was possible here only at certain periods, but no other suitable location on the river near and opposite Station No. 4 was found. The preliminary nature of this study did not justify a special effort to keep the river open in winter or the use of a boat to sample at this point.

Weekly sampling was begun at the first four stations in December 1946, and was continued until the writer left Ottawa on field work in June 1947. In the autumn, periodic sampling was continued until December 1947. No field tests other than water temperature readings were carried out on these samples.

DISCUSSION

Table I shows the data obtained by these studies on Ottawa River water from Station No. 1. The maximum and minimum values shown are those found for any one determination. It is interesting to note how closely these composite analyses check when the analyses are balanced as to cations and anions.

Figure 2 shows graphically some of the same data and indicates that Ottawa River at the filter plant intake is fairly constant in composition and is a soft, highly coloured, slightly alkaline water low in iron and non-carbonate solids. The turbidity of the river, even in flood, was never very high at this point.

When high water occurred in early April, total alkalinity, total hardness, total residue, and turbidity increased. As shown in Figure 2 these values rapidly return to normal, but the river flow remains high for some time. This is believed to be due to the fact that there are two flood crests: the first being the local run-off and waters from tributaries in the lower part of the basin, many draining clay land; and the second being run-off from melting snow in the Laurentian Highlands. The latter waters, being soft in character with low mineral content, cause the decrease in values noted though the river discharge remains high. From this study it appears that there is only a short period (4 to 5 weeks) in the year when marked changes occur in the river at this point.

Tables II, III, and IV are similar summaries of data at the other sampling stations, and Figures 3, 4, and 5 show the tabled data in graphical form.

Table II and Figure 3 clearly show the difference in character between Rideau River and Ottawa River waters. Although the colour of the Rideau water is almost as high as the Ottawa water, there is a much greater

TABLE I

Chemical Analyses of Ottawa River Water at Ottawa, Ont. (Station No. 1)

(In parts per million)

No.	Date of collection	Sample No.	Storage period (Days)	Stream discharge (Second-feet) at Chat Falls: On sampling date	Stream discharge (Second-feet) at Chat Falls: 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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
1	Dec. 10/46.....	1286A	16	27,588		46·0	.....	.....	7·6	40	4·0	.....	.....	.....	78·0	0·1060	5,800	.....	13·1
2	19*.....	1291	18	35,455	27,295	32·1	.....	.....	7·5	60	11·0	.....	.....	.....	79·0	0·1074	7,570	.....	13·1
3	27.....	1296A	13	26,687		32·0	.....	.....	7·6	60	7·0	.....	.....	.....	74·5	0·1013	5,370	.....	10·2
4	Jan. 2/47.....	1300	10	29,400		32·0	.....	.....	7·2	55	3·0	.....	.....	.....	76·0	0·1033	6,090	.....	12·1
5	9.....	1304	12	29,199		32·0	.....	1·7	7·3	45	2·7	.....	.....	.....	68·5	0·0932	5,360	.....	9·5
6	17*.....	1319	11	30,195	29,235	32·5	.....	3·5	7·3	40	3·5	.....	.....	.....	71·5	0·0974	5,840	.....	10·7
7	24.....	1324A	7	30,022		32·0	.....	3·5	7·4	50	2·3	.....	.....	.....	66·0	0·0898	5,340	.....	10·5
8	30.....	1333	4	32,458		32·4	.....	3·5	7·2	50	1·2	.....	.....	.....	72·5	0·0987	6,360	.....	10·6
9	Feb. 7/47.....	1342A	3	32,298		34·3	.....	6·0	7·3	40	2·3	.....	.....	.....	73·5	0·0999	6,400	.....	10·8
10	13*.....	1367	5	29,371	29,735	32·2	.....	4·2	7·4	50	2·4	.....	.....	.....	73·0	0·0994	5,790	.....	12·5
11	3 weekly samples not taken																		
12	Mar. 14/47.....	1390	12	28,913		32·9	.....	.....	7·2	37	2·3	.....	.....	.....	68·0	0·0925	5,300	.....	13·6
13	21*.....	1398	5	28,910	27,830	33·4	.....	.....	7·3	38	2·8	.....	.....	.....	72·0	0·0980	5,610	.....	10·7
14	29.....	1402	3	28,672		33·1	.....	.....	7·3	40	3·2	.....	.....	.....	75·0	0·1019	5,800	.....	11·4
15	Apr. 3/47.....	1406	5	29,077		33·8	.....	.....	7·4	45	6·0	.....	.....	.....	77·5	0·1053	6,070	.....	11·4
16	9.....	1419	2	55,406	81,375	35·2	.....	.....	7·4	40	24·0	.....	.....	.....	94·5	0·1284	14,120	.....	14·3
17	18*.....	1425	1	115,295		34·5	.....	.....	7·4	50	20·0	.....	.....	.....	99·0	0·1346	30,700	.....	14·3
18	25.....	1431	3	98,845		39·2	.....	.....	7·4	50	8·0	.....	.....	.....	79·5	0·1081	21,150	.....	12·2
19	May 3/47.....	1440	16	127,813		40·6	.....	.....	7·4	55	10·0	.....	.....	.....	77·5	0·1053	26,680	.....	10·0
20	9.....	1448	2	157,568	148,125	42·8	.....	.....	7·4	45	4·3	.....	.....	.....	72·5	0·0986	30,780	.....	7·9
21	16.....	1470	4	144,940		46·8	.....	.....	7·2	55	1·9	.....	.....	.....	58·4	0·0794	22,810	.....	8·6
22	23*.....	1481	1	151,602		50·9	.....	.....	7·6	55	2·5	.....	.....	.....	60·2	0·0819	24,560	.....	9·1
23	June 2/47*....	1492	1	160,265	156,180	50·0	.....	.....	7·3	50	4·8	.....	.....	.....	61·4	0·0836	26,520	.....	8·0
	4 weekly samples not taken																		
24	July 2/47*....	1567	7	118,015	63,305	63·0	.....	.....	7·0	50	6·4	.....	.....	.....	58·2	0·0792	18,540	23·4	8·2
	3 weekly samples not taken																		
25	Aug. 1*.....	1611	18	46,808	59,240	70·0	.....	.....	7·1	55	6·4	.....	.....	.....	65·6	0·0893	8,160	25·8	9·1
	3 weekly samples not taken																		
26	Sept. 1*.....	1651	28	16,074	21,325	73·0	.....	.....	7·7	45	2·0	.....	.....	57·53	60·4	0·0822	2,630	24·6	8·0
	4 weekly samples not taken																		
27	Oct. 1/47*....	1690	29	23,958	20,892	55·0	.....	.....	7·7	55	5·6	.....	.....	74·03	62·0	0·0844	4,010	24·6	9·2
	4 weekly samples not taken																		
28	Nov. 7/47.....	1710	8	21,041		50·4	.....	.....	7·5	65	5·1	.....	.....	67·43	62·4	0·0849	3,540	22·6	8·0
	14.....	No sample taken			19,008														
29	21*.....	1728	5	21,236		39·2	.....	.....	6·7	45	7·1	.....	.....	71·39	60·8	0·0828	3,480	20·6	8·4
	28.....	No sample taken																	
30	Dec. 5/47.....	1764	28	23,856		32·4	.....	.....	7·1	50	4·0	.....	.....	66·33	61·4	0·0836	3,960	25·0	10·0
	12.....	No sample taken			21,447														
31	19.....	1768	14	21,884		32·0	.....	.....	7·1	50	6·3	.....	.....	69·19	66·6	0·0906	3,930	24·4	10·4
32	Maximum values.....		29	160,265	156,180	73·0	.....	.....	7·8	65	24·0	.....	.....	.....	99·0	0·1346	30,780	.....	14·3
33	Minimum values.....		1	16,074	19,008	32·0	.....	.....	6·7	37	1·0	.....	.....	.....	58·2	0·0792	2,630	.....	7·9
34	Average values..	30 samples	9·7	.....	54,230	41·4	.....	.....	7·3	48·8	5·7	.....	.....	67·65 6 samples	70·8	0·0963	10,775	23·9 8 samples	10·5
35	Average values.	25 samples **	8·4	.....	48,006	37·2	.....	.....	7·3	48·4	5·9	.....	.....	.....	72·7	.....	.....	.....	11·0

Levels at Ottawa, Ont.
Maximum 54·2
Minimum 51·9
Average 53·0

* Monthly samples included in the average of twelve samples in Table VI, pages 22-23.
** Average of total period less samples for June to October inclusive.

TABLE I—Concluded

Chemical Analyses of Ottawa River Water at Ottawa, Ont. (Station No. 1)—Concluded

(In parts per million)

Magnesium (Mg)	Alkalis as sodium: Sodium (Na)	Alkalis as sodium: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
1·5	3·8		.....	0·05	.....	.....	0	10·3	1·4	8·0	.....	.....	0	34·4	0	6·0	.....	10·7	38·9	8·73	.....	.....	1·2	1
2·4	2·5		.....	0·05	.....	.....	0·66	13·2	0	3·5	.....	.....	0	37·5	0	4·0	.....	11·9	42·6	5·46	.....	.....	1·2	2
2·8	3·8		.....	0·08	.....	.....	0	12·3	0	6·2	.....	.....	0	34·2	0	3·0	.....	9·0	37·0	3·64	.....	.....	1·4	3
3·5	3·6‡		.....	0·02	.....	.....	0·2	11·5	0	3·3	.....	.....	0	31·7	0	1·5	.....	18·7	44·6	3·46	.....	.....	1·6	4
3·7	2·0‡		.....	0·02	.....	.....	0	9·1	0	6·2	.....	.....	0	29·3	0	5·0	.....	14·6	38·6	2·57	.....	.....	1·8	5
1·3	5·1		.....	0·06	.....	.....	0	14·4	0	4·4	.....	.....	.....	30·5	0	2·5	.....	7·1	32·1	8·23	.....	.....	1·7	6
3·5	2·1‡		.....	0·04	.....	.....	0	10·3	0	5·3	.....	.....	.....	29·3	0	4·0	.....	16·6	40·6	3·00	.....	.....	1·6	7
2·8	0·9		.....	0·06	.....	.....	0	11·1	0	3·5	.....	.....	.....	31·1	0	0·5	.....	12·4	37·9	3·79	.....	.....	1·8	8
2·4	1·9		.....	0·03	.....	.....	0	11·1	0	4·4	.....	.....	.....	31·7	0	2·0	.....	10·8	36·8	4·50	.....	.....	1·7	9
2·4	1·1‡		.....	0·02	.....	.....	0	9·9	0	3·5	.....	.....	.....	30·7	0	2·5	.....	15·9	41·1	5·21	.....	.....	1·6	10
																								11
2·6	1·3‡		.....	0·05	.....	.....	0	13·6	0	4·4	.....	.....	.....	29·3	0	6·5	.....	20·6	44·6	5·23	.....	.....	1·6	12
3·3	0·3		.....	0·08	.....	.....	0	13·2	0	2·7	.....	.....	.....	30·5	0	4·5	.....	15·3	40·3	3·24	.....	.....	1·6	13
3·1	2·0		.....	0·06	.....	.....	0	13·6	0	4·4	.....	.....	.....	34·2	0	3·5	.....	13·2	41·2	3·68	.....	.....	1·7	14
3·7	2·6		.....	0·04	.....	.....	0	13·2	0	4·4	.....	.....	.....	39·1	0	6·5	.....	11·6	43·6	3·08	.....	.....	1·5	15
5·7	3·1		.....	0·20	.....	.....	0	16·5	0	3·5	.....	.....	.....	46·4	0	9·0	.....	21·2	59·2	2·51	.....	.....	1·2	16
4·4	1·8‡		.....	0·07	.....	.....	0	14·4	0	3·5	.....	.....	.....	38·6	0	11·5	.....	22·2	53·8	3·25	.....	.....	1·3	17
2·8	7·1		.....	0·07	.....	.....	0	16·0	0	3·1	.....	.....	.....	34·2	0	4·0	.....	13·9	41·9	4·36	.....	.....	1·4	18
3·5	6·7		.....	0·02	.....	.....	0	14·4	0	3·5	.....	.....	.....	31·0	0	5·5	.....	14·0	39·4	2·86	.....	.....	1·4	19
3·1	8·3		.....	0·09	.....	.....	0	17·3	0	1·8	.....	.....	.....	26·8	0	7·0	.....	10·5	32·5	2·55	.....	.....	1·6	20
2·9	5·1		.....	0·02	.....	.....	0	9·9	0	2·7	.....	.....	.....	25·9	0	6·0	.....	12·2	33·4	2·97	.....	.....	2·0	21
2·6	4·7		.....	0·001	.....	.....	0·01	9·1	0	2·7	.....	.....	.....	27·6	0	7·0	.....	10·8	33·4	3·50	.....	.....	1·6	22
2·5	3·0		.....	0·002	.....	.....	0	9·1	0	3·1	.....	.....	.....	26·1	0	6·8	.....	8·9	30·3	3·20	.....	.....	1·8	23
2·4	3·1		.....	0·41	.....	.....	0	8·4	0	1·3	.....	.....	.....	24·2	0	7·4	.....	10·5	30·3	3·42	.....	.....	2·2	24
3·0	2·9		.....	0·22	.....	.....	0	8·4	0	4·9	.....	.....	.....	30·3	0	4·4	.....	10·3	35·1	3·03	.....	.....	1·9	25
2·4	4·1		.....	0·28	.....	.....	0	9·2	0	1·6	.....	.....	.....	31·5	0	7·4	.....	14·0	29·8	3·33	.....	.....	1·4	26
3·1	3·6		.....	0·27	.....	.....	0	9·7	0	0·62	.....	.....	.....	31·0	0	6·4	.....	10·3	35·7	2·97	.....	.....	1·4	27
3·5	2·9		.....	0·37	.....	.....	0	11·9	0	0·75	.....	.....	.....	29·3	0	6·2	.....	6·4	30·4	2·29	.....	.....	1·6	28
3·1	4·3		.....	0·26	.....	.....	0	10·9	0	0·62	.....	.....	.....	31·2	0	6·4	.....	8·1	33·7	2·71	.....	.....	2·4	29
3·2	3·9		.....	0·30	.....	.....	0	12·8	0	1·3	.....	.....	.....	27·3	0	6·8	.....	15·7	38·1	3·13	.....	.....	2·0	30
2·5	4·0		.....	0·40	.....	.....	0	13·0	0	2·7	.....	.....	.....	27·3	0	8·4	.....	13·9	36·3	4·16	.....	.....	2·0	31
5·7	8·3		.....	0·41	.....	.....	0·66	17·3	1·4	8·0	.....	.....	.....	46·4	0	11·5	.....	22·2	59·2	8·7	35·7	.....	2·4	32
1·3	0·3		.....	0·001	.....	.....	0	8·4	0	0·62	.....	.....	0	24·2	0	0·5	.....	6·4	29·8	2·3	1·6	.....	1·2	33
3·0	3·4		.....	0·12	.....	.....	0·79	11·9	0	3·4	.....	.....	.....	31·4	0	5·4	.....	13·0	38·4	3·50	16·1	.....	1·65	34
3·1	3·4		.....	0·10	.....	.....	0	12·5	0	3·5	.....	.....	.....	31·9	0	5·6	.....	13·5	39·6	3·55	15·5	.....	1·58	35

‡ Values calculated.

load of material carried by this medium-hard to hard river water than by the softer Ottawa River water. The variation in the mineral content is much wider, the hardness being mostly carbonate in Rideau River water. This river carries appreciable incrustating solids, has a higher iron content than Ottawa River, and is low in alkali metals. Chloride and other pollution is indicated, especially during the winter months. The wide variation in mineral content and water quality is also shown by the changing saturation index.

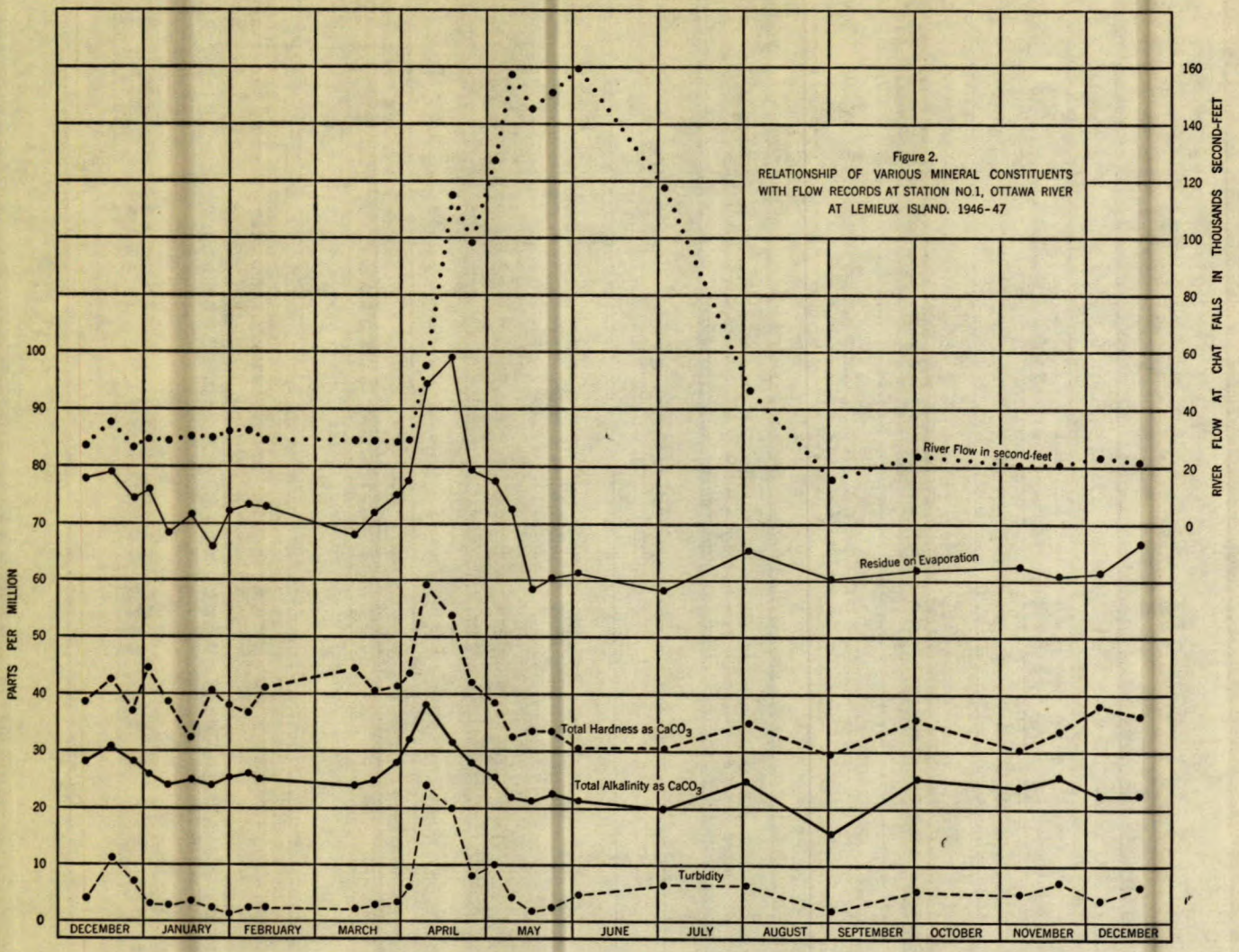

Figure 2

Figure 3 shows a marked decrease in many important constituents with increase in Rideau River discharge. The wide fluctuation in flow is partly due to control dams and canals along the river. The amount of the total residue, the total hardness, and the total alkalinity present decreases rapidly as the river rises in the spring. This and the marked increase in turbidity indicate that the run-off is rapid over a large area and is a softer water as it has had little chance to dissolve matter. The flood season is short and thus flooding is in the nature of flash floods. In the dry summer and in spring, the inflow to the river is probably largely from ground waters and small streams, and an increase in hardness, etc., is then noted. During these seasons surface drainage from the surrounding clay soil is high in solids and is hard because the water has had time to dissolve matter from the soil.

Rideau River in the vicinity of Ottawa must be classified as a poor stream for industrial use, in comparison with Ottawa River, because of its hardness and varying quality.

Table III and Figure 4 show that Gatineau River water is very similar in quality to that of Ottawa River, being soft, highly coloured, and low in incrustating solids and iron. Gatineau River also shows a rapid increase in solids, hardness, etc., when in flood, and possibly some increase during the winter months. Greater fluctuations in turbidity are noted than in Ottawa River, possibly because of the control dams along its lower course.

Table IV and Figure 5 show the quality of the lower Ottawa River. Although the water at Station No. 4 shows some change from that at Station No. 1, the variation is relatively unimportant as regards most constituents. However, there seems to be a greater variation in turbidity at this point and this and the other variations noted are probably contributed by Gatineau River.

Table V shows the very limited data available at Station No. 5.

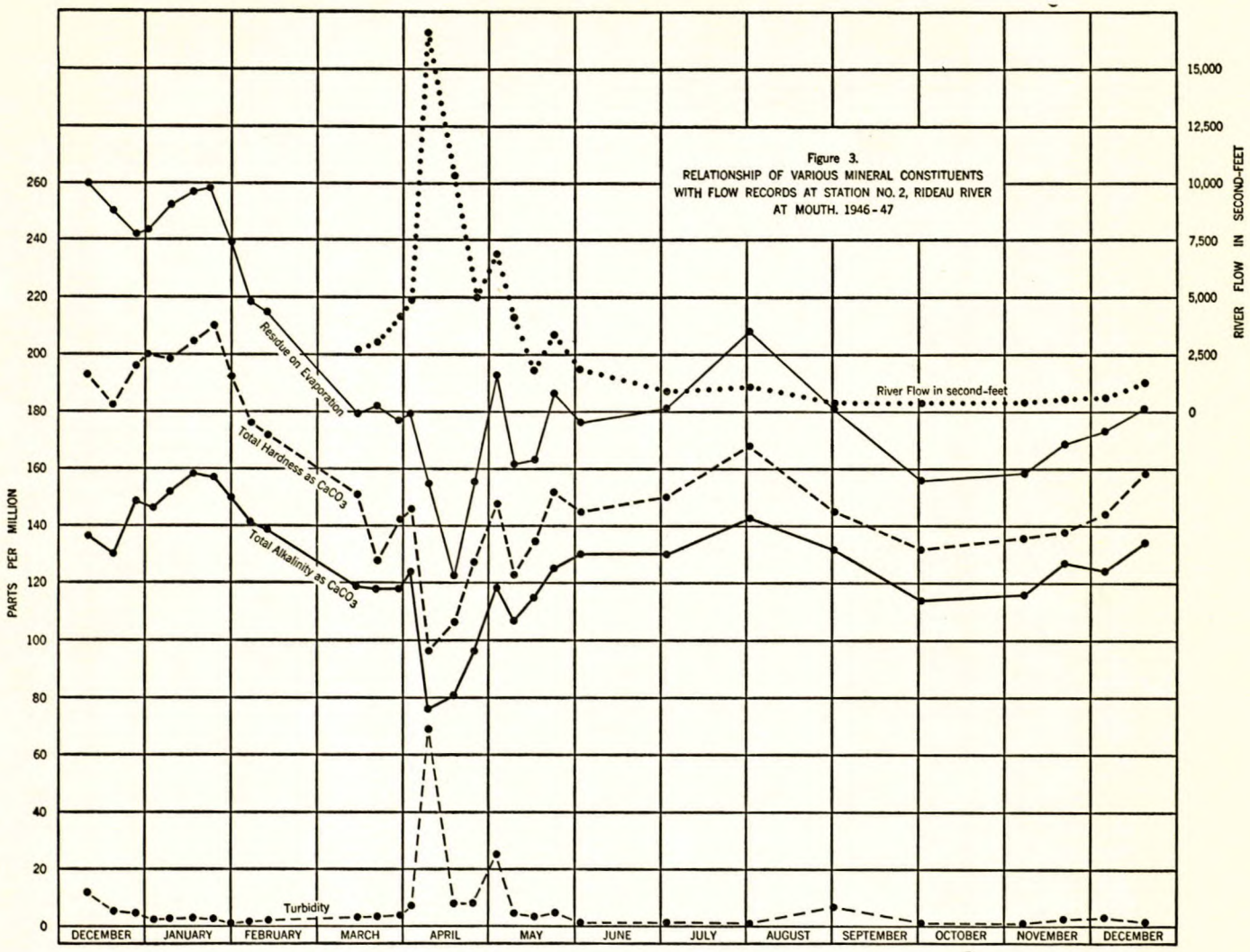

Figure 3

Table VI is a summary of the average analyses calculated from the data found in Tables I, II, III, and IV. These averages were calculated on twenty-five samples at each of the four locations. Averages of the thirty samples taken at Stations No. 1 and No. 2 are also given. Averages were also calculated for fifty-two weekly samples at Stations No. 1 and No. 2. The mean of the values obtained when sampling stopped and started was used for the weeks when no sampling was done. For example, no samples were taken on February 20, February 27, or March 7, so the average of the values obtained on February 13 and March 14 were used for all three missing samples. The average of twelve monthly samples was also determined, the twelve samples taken being indicated by an asterisk in Tables I, II, III, and IV. Where monthly samples were missing, as at Stations No. 3 and No. 4, an average of the data for samples of May 23 and November 7 was used.

The averages calculated on the different groups of samples indicate that for these rivers monthly sampling gives results that show the trend of river water quality. If high and low water samples are also obtained, it is considered that for most Canadian rivers a monthly sampling program will give a satisfactory estimate of the river quality for most industrial purposes. It is apparent, however, that monthly sampling can fail to show rapid appreciable changes, and that a complete picture of all seasonal variations can be obtained only by twice weekly or, preferably, daily sampling and compositing.

TABLE II

Chemical Analyses of Rideau River Water at Mouth (Station No. 2)

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids) P.P.M.	Residue on Evaporation (Dissolved solids) Tons per acre-foot	Residue on Evaporation (Dissolved solids) Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
1	Dec. 10/46.....	1287A	25	Ice conditions		44·2	.....	.....	8·0	60	12·0	.....	.....	.....	259·5	0·401	.....	.....	52·5
2	19*.....	1292	25	"		32·1	.....	.....	7·9	75	5·5	.....	.....	.....	250·0	0·340	.....	.....	47·5
3	27.....	1297A	13	"		31·6	.....	.....	7·9	70	4·5	.....	.....	.....	242·0	0·339	.....	.....	49·8
4	Jan. 3/47.....	1301	10	"		32·1	.....	.....	7·8	80	2·5	.....	.....	.....	243·5	0·331	.....	.....	51·5
5	9.....	1305	20	"		31·8	.....	4·7	7·7	65	3·0	.....	.....	.....	252·5	0·343	.....	.....	51·5
6	17*.....	1320	18	"		31·6	.....	6·0	7·8	50	3·0	.....	.....	.....	257·5	0·350	.....	.....	53·7
7	24.....	1325A	7	"		31·7	.....	15·0	7·6	65	2·3	.....	.....	.....	258·5	0·352	.....	.....	54·8
8	30.....	1334	4	"		32·2	.....	9·0	7·6	60	1·3	.....	.....	.....	239·5	0·326	.....	.....	50·4
9	Feb. 7/47.....	1343A	3	"		31·8	.....	13·0	7·6	45	1·8	.....	.....	.....	218·5	0·297	.....	.....	46·8
10	13*.....	1368	5	"		31·6	.....	8·1	7·7	50	2·0	.....	.....	.....	214·5	0·292	.....	.....	46·1
11	3 weekly samples not taken																		
12	Mar. 14/47.....	1391	12	2,700		32·9	.....	.....	8·1	37	3·0	.....	.....	.....	179·5	0·244	.....	.....	41·5
13	21*.....	1399	5	3,180	3,430	33·6	.....	.....	7·6	37	3·2	.....	.....	.....	182·0	0·247	.....	.....	39·3
14	29.....	1403	3	4,190		32·4	.....	.....	7·6	45	3·8	.....	.....	.....	177·0	0·241	.....	.....	37·2
15	April 3/47.....	1407	5	4,810		33·8	.....	.....	7·6	50	7·0	.....	.....	.....	179·5	0·244	.....	.....	38·6
16	9.....	1420	2	16,600	9,350	35·2	.....	.....	7·6	40	69·0	.....	.....	.....	155·0	0·211	.....	.....	24·3
17	18*.....	1426	1	10,300		40·1	.....	.....	7·8	50	8·0	.....	.....	.....	122·5	0·167	.....	.....	26·4
18	25.....	1432	3	4,940		47·8	.....	.....	7·9	45	8·0	.....	.....	.....	156·0	0·212	.....	.....	31·4
19	May 3/47.....	1441	16	6,840		43·7	.....	.....	8·1	50	25·0	.....	.....	.....	193·0	0·262	.....	.....	37·2
20	9.....	1449	1	4,260	3,430	47·3	.....	.....	8·1	50	4·6	.....	.....	.....	162·0	0·221	.....	.....	31·4
21	16.....	1471	4	1,800		53·1	.....	.....	8·0	70	3·5	.....	.....	.....	163·4	0·222	.....	.....	36·1
22	23*.....	1482	1	3,350		59·0	.....	.....	8·0	65	4·8	.....	.....	.....	186·5	0·254	.....	.....	40·0
23	June 2/47*....	1494	11	1,800	2,210	.....	.....	.....	7·7	65	0·9	.....	.....	.....	176·2	0·240	.....	.....	38·8
	3 weekly samples not taken																		
24	July 2/47*....	1568	6	920	1,840	.....	.....	.....	7·5	60	1·0	.....	.....	.....	181·6	0·247	.....	74·6	39·8
	3 weekly samples not taken																		
25	Aug. 1/47*....	1612	18	1,160	573	.....	.....	.....	7·6	75	1·2	.....	.....	.....	208·0	0·273	.....	98·0	41·6
	3 weekly samples not taken																		
26	Sept. 1/47*....	1652	27	350	489	.....	.....	.....	7·7	45	6·4	.....	.....	265·1	181·0	0·246	.....	44·8	38·2
	4 weekly samples not taken																		
27	Oct. 1/47*....	1689	29	436	399	48·2	.....	.....	8·3	40	1·5	.....	.....	238·9	156·2	0·212	.....	36·2	34·3
	4 weekly samples not taken																		
28	Nov. 7/47.....	1711	8	364	601	48·2	.....	1·7	8·0	35	1·8	.....	.....	249·2	159·0	0·216	.....	45·5	34·0
	1 weekly sample not taken																		
29	21*.....	1729	5	518		36·1	.....	5·5	8·1	40	2·8	.....	.....	272·6	168·8	0·230	.....	32·8	37·5
	1 weekly sample not taken																		
30	Dec. 5/47.....	1765	28	563	714	32·0	.....	3·5	8·2	35	3·7	.....	.....	269·2	173·8	0·236	.....	40·2	39·5
	1 weekly sample not taken																		
31	19.....	1769	14	1,300		31·6	.....	.....	8·2	40	2·0	.....	.....	283·0	181·6	0·247	.....	40·4	42·4
32	Maximum values.....		29	.....	.....	.....	.....	.....	8·3	80	69·0	.....	.....	.....	259·5	0·401	.....	.....	54·8
33	Minimum values.....		1	.....	.....	30·6	.....	.....	7·5	35	1·0	.....	.....	.....	122·5	0·167	.....	.....	24·3
34	Average values.	30 samples	10·9	.....	.....	.....	.....	.....	7·8	53·1	6·6	.....	.....	263·0 6 samples	196·0	0·267	.....	51·5 8 samples	41·1
35	Average values.	25 samples **	9·4	.....	.....	37·9	.....	.....	7·8	52·4	7·5	.....	.....	.....	199·0	0·271	.....	.....	41·7

* Monthly samples included in the average of twelve samples in Table VI, pages 22-23.
** Average of total period less samples for June to October inclusive.

TABLE II—Concluded

Chemical Analyses of Rideau River Water at Mouth (Station No. 2)—Concluded

(In parts per million)

Magnesium (Mg)	Alkalis as sodium: Sodium (Na)	Alkalis as sodium: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
15·1	8·1		.....	0·42	.....	.....	0	36·6	2·8	12·4	.....	.....	0	166·4	0	22·5	.....	56·7	193·1	3·48	.....	0·3	.....	1
15·5	7·5		.....	0·03	.....	.....	0	38·7	1·5	4·4	.....	.....	0	158·8	0	26·0	.....	52·1	182·3	3·06	.....	0·2	.....	2
17·5	5·2		.....	0·08	.....	.....	0·01	37·9	1·4	4·4	.....	.....	0	180·9	0	1·5	.....	48·0	196·3	2·85	.....	0·2	.....	3
17·5	6·6		.....	0·10	.....	.....	0·16	37·9	2·0	7·0	.....	.....	0	179·7	0	2·0	.....	53·2	200·5	2·94	.....	0·1	.....	4
17·0	6·8		.....	0·02	.....	.....	0·23	37·9	2·5	3·7	.....	.....	0	185·4	0	6·5	.....	46·5	198·5	3·03	.....	0·2	.....	5
17·3	9·7		.....	0·06	.....	.....	0·13	39·9	2·5	5·6	.....	.....	.....	192·0	0	3·0	.....	46·9	204·9	3·10	.....	0·2	.....	6
17·7	8·1		.....	0·08	.....	.....	0·03	39·5	4·7	5·3	.....	.....	.....	191·5	0	4·0	.....	53·4	210·4	3·10	.....	0·1	.....	7
16·2	7·4		.....	0·03	.....	.....	0·20	34·2	2·0	5·0	.....	.....	.....	183·0	0	5·0	.....	42·4	192·4	3·11	.....	0	0	8
14·9	4·6		.....	0·04	.....	.....	0·01	27·1	2·2	6·2	.....	.....	.....	172·0	0	2·0	.....	36·6	178·1	3·14	.....	.....	0·1	9
13·8	7·8		.....	0·04	.....	.....	0·01	26·7	0·8	4·4	.....	.....	.....	169·3	0	1·5	.....	33·2	172·0	3·34	.....	0·1	.....	10
11·6	6·4		.....	0·06	.....	.....	0·01	21·0	0	4·0	.....	.....	.....	145·2	0	3·5	.....	32·2	151·2	3·58	.....	0·3	.....	11 12
11·6	7·8		.....	0·15	.....	.....	0·03	24·7	0	4·4	.....	.....	.....	143·7	0	4·5	.....	9·9	127·7	3·39	.....	.....	0·2	13
12·0	5·8		.....	0·14	.....	.....	0·01	21·0	0	5·8	.....	.....	.....	144·6	0	3·5	.....	23·7	142·2	3·10	.....	.....	0·2	14
12·2	6·8		.....	0·21	.....	.....	0·05	23·1	0	5·2	.....	.....	.....	151·8	0	6·5	.....	22·1	146·5	3·16	.....	.....	0·2	15
8·7	1·1		.....	1·4	.....	.....	0·03	13·6	0	2·6	.....	.....	.....	93·5	0	23·0	3·5	19·8	96·4	2·79	.....	.....	0·6	16
9·8	2·6		.....	0·02	.....	.....	0·01	13·6	0	3·1	.....	.....	.....	98·1	0	4·0	3·5	25·8	106·2	2·69	.....	.....	0·3	17
11·8	5·2		.....	0·08	.....	.....	0	20·2	0	2·2	.....	.....	.....	117·9	0	4·5	3·5	30·3	126·9	2·66	.....	.....	0·2	18
13·3	5·8		.....	0·37	.....	.....	0	23·1	0	3·5	.....	.....	.....	144·7	0	10·5	8·4	28·9	147·5	2·80	.....	0·3	.....	19
10·9	7·5		.....	0·07	.....	.....	0	25·9	0	2·2	.....	.....	.....	130·5	0	3·0	3·8	16·2	123·2	2·88	.....	0·1	.....	20
10·9	2·3		.....	0·01	.....	.....	0·01	31·9	0	2·2	.....	.....	.....	140·3	0	2·0	2·4	20·0	135·0	3·31	.....	0·1	.....	21
12·7	1·3		.....	0·045	.....	.....	0·02	17·7	0	2·6	.....	.....	.....	152·0	0	8·5	4·6	27·5	152·1	3·15	.....	0·2	.....	22
10·9	4·0		.....	0·03	.....	.....	0·20	14·8	0	2·7	.....	.....	.....	158·6	0	3·0	1·6	15·4	145·4	3·56	.....	.....	0·1	23
12·2	3·6		.....	0·28	.....	.....	0	12·0	0	1·8	.....	.....	.....	158·6	0	5·2	1·8	19·5	149·5	3·26	.....	.....	0·3	24
15·5	1·6		.....	0·32	.....	.....	0	11·1	0	1·8	.....	.....	.....	174·7	0	6·5	1·4	24·3	167·6	2·68	.....	.....	0·1	25
12·1	4·7		.....	0·11	.....	.....	0	9·1	0	1·2	.....	.....	.....	161·3	0	3·2	3·0	12·9	145·1	3·16	.....	.....	0·1	26
11·2	3·0		.....	0·16	.....	.....	0	15·7	0	0·35	.....	.....	.....	139·3	0	4·4	4·2	17·4	131·6	3·06	.....	0·4	.....	27
12·5	3·0		.....	0·02	.....	.....	0·01	21·0	0	0·53	.....	.....	.....	141·6	0	7·0	1·2	20·4	136·4	2·72	.....	0·2	.....	28
11·0	5·8		.....	0·10	.....	.....	0	19·3	0	0·35	.....	.....	.....	154·5	0	2·8	1·4	11·8	138·4	3·41	.....	0·3	.....	29
11·1	6·5		.....	0·11	.....	.....	0	20·3	1·6	0·84	.....	.....	.....	151·0	0	4·2	2·6	20·4	144·2	3·56	.....	0·4	.....	30
12·9	4·8		.....	0·03	.....	.....	0	21·2	1·5	1·8	.....	.....	.....	163·0	0	3·4	2·8	25·3	158·9	3·29	.....	0·5	.....	31
17·7	9·7		.....	1·40	.....	.....	0·23	39·9	4·7	12·4	.....	.....	.....	192·0	0	26·0	8·4	56·7	210·4	3·58	11·7	0·5	.....	32
8·7	1·1		.....	0·01	.....	.....	0	9·1	0	0·35	.....	.....	0	93·5	0	1·5	1·2	9·9	96·4	2·66	2·1	.....	0·6	33
13·2	5·4		.....	0·15	.....	.....	0·04	24·6	0·8	3·58	.....	.....	.....	154·8	0	6·2	.....	29·8	156·7	3·1	7·0	0·1	.....	34
13·4	5·8		.....	0·14	.....	.....	0·04	27·0	1·0	3·98	.....	.....	.....	154·2	0	6·5	.....	32·2	158·5	3·1	7·3	0·1	.....	35

TABLE III

Chemical Analyses of Gatineau River at Farmers' Rapids Dam (Station No. 3)

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
1	Dec. 10/46.....	1288A	25	.....	.....	49·1	.....	.....	7·4	80	12·0	.....	.....	.....	98·5	0·1338	.....	.....	18·2
2	19*.....	1293	25	.....	.....	35·6	.....	.....	7·7	55	3·0	.....	.....	.....	50·5	0·0687	.....	.....	9·1
3	27.....	1298A	20	.....	.....	32·9	.....	.....	8·2	65	6·0	.....	.....	.....	64·0	0·0871	.....	.....	11·1
4	Jan. 3/47.....	1302	17	.....	.....	34·2	.....	0·8	8·5	55	2·0	.....	.....	.....	63·0	0·0857	.....	.....	11·8
5	9.....	1308	20	.....	.....	33·8	.....	0·8	7·9	55	3·0	.....	.....	.....	55·0	0·0749	.....	.....	9·4
6	17*.....	1322	11	.....	.....	36·0	.....	1·5	7·4	55	2·5	.....	.....	.....	52·0	0·0707	.....	.....	9·1
7	24.....	1328	7	.....	.....	34·2	.....	2·0	7·7	70	1·5	.....	.....	.....	50·5	0·0687	.....	.....	9·1
8	30.....	1336	4	.....	.....	34·2	.....	1·5	7·8	55	0·5	.....	.....	.....	50·0	0·0680	.....	.....	7·7
9	Feb. 7/47.....	1345	3	.....	.....	34·3	.....	1·0	8·5	55	0·6	.....	.....	.....	52·5	0·0714	.....	.....	9·1
10	13*.....	1369	5	.....	.....	34·2	.....	2·4	7·4	50	1·4	.....	.....	.....	48·0	0·0653	.....	.....	7·6
	3 weekly samples not taken																		
11	Mar. 14/47.....	1393	12	.....	.....	34·2	.....	.....	7·2	40	2·0	.....	.....	.....	49·0	0·0667	.....	.....	8·6
12	21*.....	1401	5	.....	.....	34·2	.....	.....	7·2	40	3·0	.....	.....	.....	47·5	0·0646	.....	.....	7·2
13	29.....	1405	3	.....	.....	34·2	.....	.....	7·5	40	2·6	.....	.....	.....	48·5	0·0660	.....	.....	7·9
14	April 3/47.....	1409	5	.....	.....	34·7	.....	.....	7·4	45	5·8	.....	.....	.....	52·5	0·0714	.....	.....	7·2
15	9.....	1422	2	.....	.....	35·6	.....	.....	7·5	50	40·0	.....	.....	.....	72·5	0·0985	.....	.....	8·7
16	18*.....	1420	1	.....	.....	38·8	.....	.....	7·4	45	10·0	.....	.....	.....	66·5	0·0905	.....	.....	10·7
17	26.....	1435	3	.....	.....	40·6	.....	.....	7·5	40	10·0	.....	.....	.....	75·0	0·1019	.....	.....	10·0
18	May 3/47.....	1443	16	.....	.....	39·6	.....	.....	7·5	50	10·0	.....	.....	.....	65·0	0·0884	.....	.....	9·3
19	9.....	1452	2	.....	.....	41·2	.....	.....	8·7	50	3·4	.....	.....	.....	70·5	0·0959	.....	.....	8·6
20	16.....	1473	4	.....	.....	46·0	.....	.....	7·3	50	3·8	.....	.....	.....	46·6	0·0634	.....	.....	9·0
21	23*.....	1484	1	.....	.....	50·0	.....	.....	7·2	55	3·1	.....	.....	.....	45·0	0·0612	.....	.....	5·5
	22 weekly samples not taken																		
22	Nov. 7/47.....	1712	8	.....	.....	50·0	.....	1·0	7·2	65	1·6	.....	.....	36·52	39·4	0·0536	.....	17·4	4·6
	1 weekly sample not taken																		
23	21*.....	1731	5	.....	.....	42·4	.....	0·8	7·3	65	2·3	.....	.....	40·15	41·4	0·0564	.....	17·8	5·4
	1 weekly sample not taken																		
24	Dec. 5/47.....	1767	28	.....	.....	34·3	.....	.....	7·5	50	3·7	.....	.....	40·15	42·4	0·0577	.....	17·2	6·5
	1 weekly sample not taken																		
25	19.....	1770	14	.....	.....	31·6	.....	.....	6·9	50	1·5	.....	.....	39·05	39·2	0·0533	.....	17·6	6·7
26	Maximum values.....		28	.....	.....	50·0	.....	.....	8·7	80	40·0	.....	.....	.....	98·5	0·1338	.....	.....	18·2
27	Minimum values.....		1	.....	.....	31·6	.....	.....	6·9	40	0·5	.....	.....	.....	39·2	0·0533	.....	.....	4·6
28	Average values.	25 samples	9·8	.....	.....	37·8	.....	.....	7·6	53·2	5·4	.....	.....	38·96 4 samples	55·4	0·0753	.....	17·5 4 samples	8·7

* Monthly samples included in the average of twelve samples in Table VI, pages 22-23.

TABLE III—Concluded

Chemical Analyses of Gatineau River at Farmers' Rapids Dam (Station No. 3)—Concluded

(In parts per million)

Magnesium (Mg)	Alkalis as sodium: Sodium (Na)	Alkalis as sodium: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
2·6	1·0		.....	0·57	.....	.....	0·1	9·5	0	14·0	.....	.....	0	47·1	0	11·0	.....	16·5	55·1	7·00	.....	.....	1·4	1
1·1	1·6		.....	0·03	.....	.....	0	8·6	0	3·5	.....	.....	0	23·2	0	2·5	.....	8·2	27·2	8·27	.....	.....	1·5	2
2·0	0·5		.....	0·09	.....	.....	0·01	7·4	0	3·5	.....	.....	0	32·0	0	2·5	.....	9·7	35·9	5·55	.....	.....	0·8	3
3·3	0·5		.....	0·04	.....	.....	0	6·2	0	5·3	.....	.....	0	34·2	0	1·5	.....	15·0	43·0	3·58	.....	.....	0·4	4
0·9	3·0		.....	0·05	.....	.....	0·01	8·6	0	3·5	.....	.....	0	26·8	0	2·0	.....	5·2	27·2	10·44	.....	.....	1·2	5
1·5	1·3		.....	0·06	.....	.....	0	7·4	0	4·9	.....	.....	.....	24·4	0	4·0	.....	8·9	28·9	6·07	.....	.....	1·8	6
2·6	0·6		.....	0·06	.....	.....	0	6·2	0	3·5	.....	.....	.....	22·4	0	2·5	.....	13·4	33·4	3·50	.....	.....	1·5	7
1·3	3·1		.....	0·06	.....	.....	0	6·6	0	4·4	.....	.....	.....	25·6	0	2·0	.....	3·6	24·6	5·92	.....	.....	1·5	8
1·1	0·5		.....	0·06	.....	.....	0	6·2	0	5·3	.....	.....	.....	21·4	0	0	.....	9·8	27·3	8·27	.....	.....	0·8	9
1·7	0·6		.....	0·05	.....	.....	0	4·9	0	4·4	.....	.....	.....	19·2	0	1·0	.....	10·3	26·0	4·47	.....	.....	2·0	10
1·5	0 7		.....	0·09	.....	.....	0	6·2	0	3·5	.....	.....	.....	19·5	0	5·0	.....	11·7	27·7	5·73	.....	.....	2·1	11
0·9	2·4		.....	0·09	.....	.....	0	7·4	0	4·0	.....	.....	.....	19·5	0	5·0	.....	5·7	21·7	8·00	.....	.....	2·2	12
0 7	4·0		.....	0·05	.....	.....	0	11·5	0	5·8	.....	.....	.....	17·7	0	4·0	.....	8·1	22·6	11·29	.....	.....	1·9	13
3·3	0·9		.....	0·05	.....	.....	0	10·3	0	5·3	.....	.....	.....	22·5	0	5·0	.....	13·2	31·6	2·18	.....	.....	1·9	14
3·3	5·6		.....	0·45	.....	.....	0	12·3	0	2·7	.....	.....	.....	27·6	0	9·0	6·0	12·7	35·3	2·64	.....	.....	1·7	15
4·4	2·6		.....	0·07	.....	.....	0	12·8	0	3·1	.....	.....	.....	31·2	0	7·5	5·5	19·2	44·8	2·43	.....	.....	1·6	16
4·4	5·9		.....	0·14	.....	.....	0	16·5	0	4·0	.....	.....	.....	29·8	0	8·5	6·6	18·7	43·1	2·27	.....	.....	1·6	17
3·1	5·4		.....	0·03	.....	.....	0	11·5	0	4·0	.....	.....	.....	26·4	0	6·0	6·6	14·4	36·0	3·00	.....	.....	1·6	18
2·4	8·8		.....	0·11	.....	.....	0	16·1	0	2·7	.....	.....	.....	25·7	0	11·5	6·3	10·2	31·4	3·58	.....	.....	0·5	19
2·0	1·4		.....	0·02	.....	.....	0	6·4	0	2·7	.....	.....	.....	19·0	0	5·8	5·6	15·1	30·7	4·50	.....	.....	2·0	20
1·7	3·3		.....	0·03	.....	.....	0	5·6	0	1·8	.....	.....	.....	16·3	0	5·6	4·3	7·3	20·7	3·24	.....	.....	2·4	21
1·8	2·1		.....	0·28	.....	.....	0	6·3	0	0·84	.....	.....	.....	15·1	0	3·0	3·6	6·5	18·9	2·56	.....	.....	2·6	22
1·2	3·9		.....	0·25	.....	.....	0	7·4	0	0·84	.....	.....	.....	17·6	0	3·2	4·2	4·0	18·4	4·50	.....	.....	2·3	23
1·7	3·0		.....	0·33	.....	.....	0	8·9	0	1·3	.....	.....	.....	15·1	0	5·2	4·0	10·9	23·3	3·82	.....	.....	2·1	24
1·9	3·1		.....	0·26	.....	.....	0	10·9	0	1·8	.....	.....	.....	17·1	0	4·6	4·0	10·6	24·6	3·52	.....	.....	2·6	25
4·4	8·8		.....	0·57	.....	.....	0·01	16·5	0	14·0	.....	.....	.....	47·1	0	11·5	.....	19·2	55·1	11·29	37·9	.....	2·6	26
0·7	0·5		.....	0·02	.....	.....	0	4·9	0	0·84	.....	.....	0	15·1	0	0	.....	3·6	18·4	2·18	2·5	.....	0·4	27
2·1	2·6		.....	0·13	.....	.....	0	8·9	0	3·9	.....	.....	.....	23·9	0	4·7	5·2 (11 samples)	10·8	30·4	4·14	15·7	.....	1·7	28

93295—2

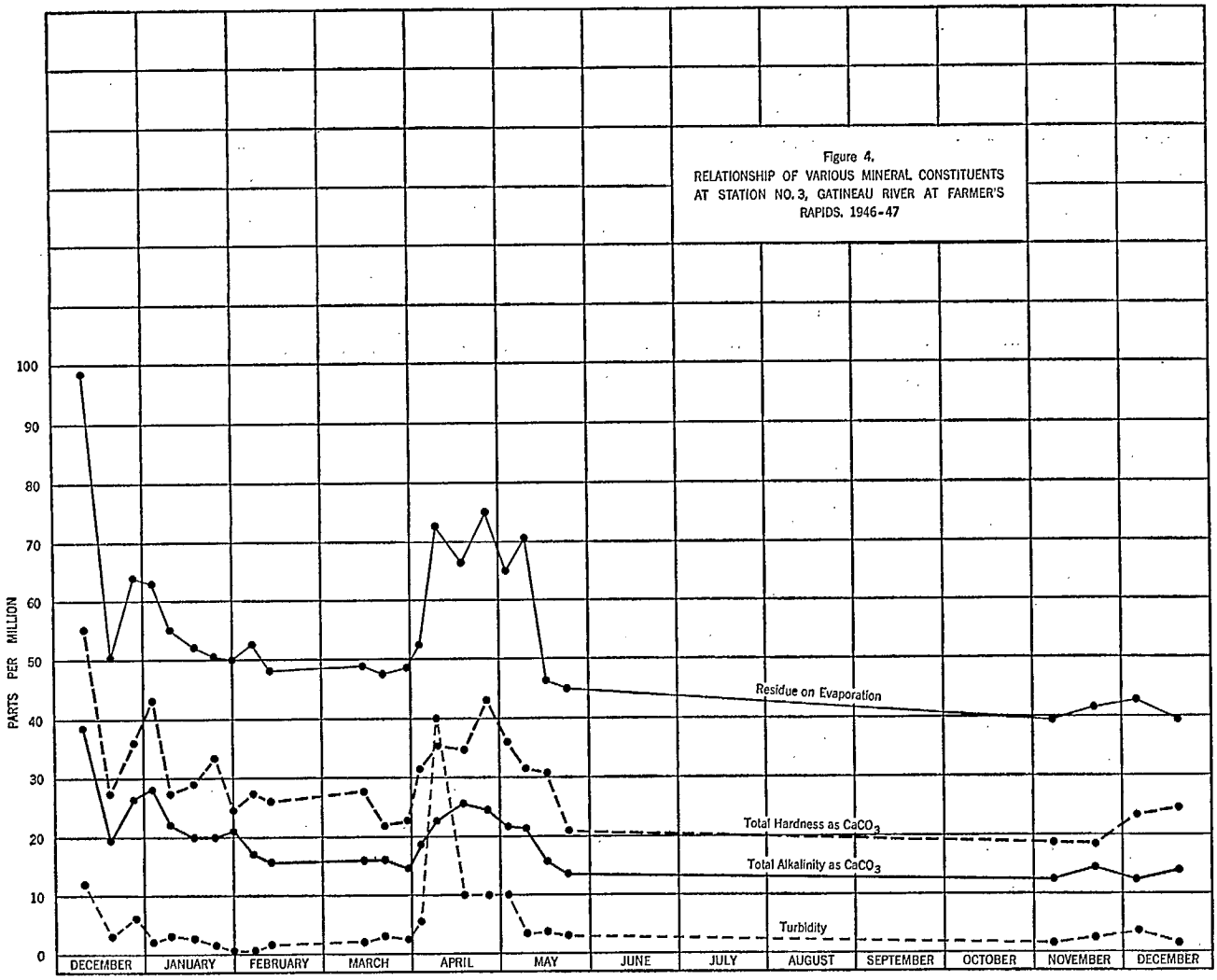
Figure 4.
RELATIONSHIP OF VARIOUS MINERAL CONSTITUENTS AT STATION NO. 3, GATINEAU RIVER AT FARMER'S RAPIDS, 1946-47
PARTS PER MILLION
100
90
80
70
60
50
40
30
20
10
0
Residue on Evaporation
Total Hardness as $CaCO_3$
Total Alkalinity as $CaCO_3$
Turbidity
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

Figure 4

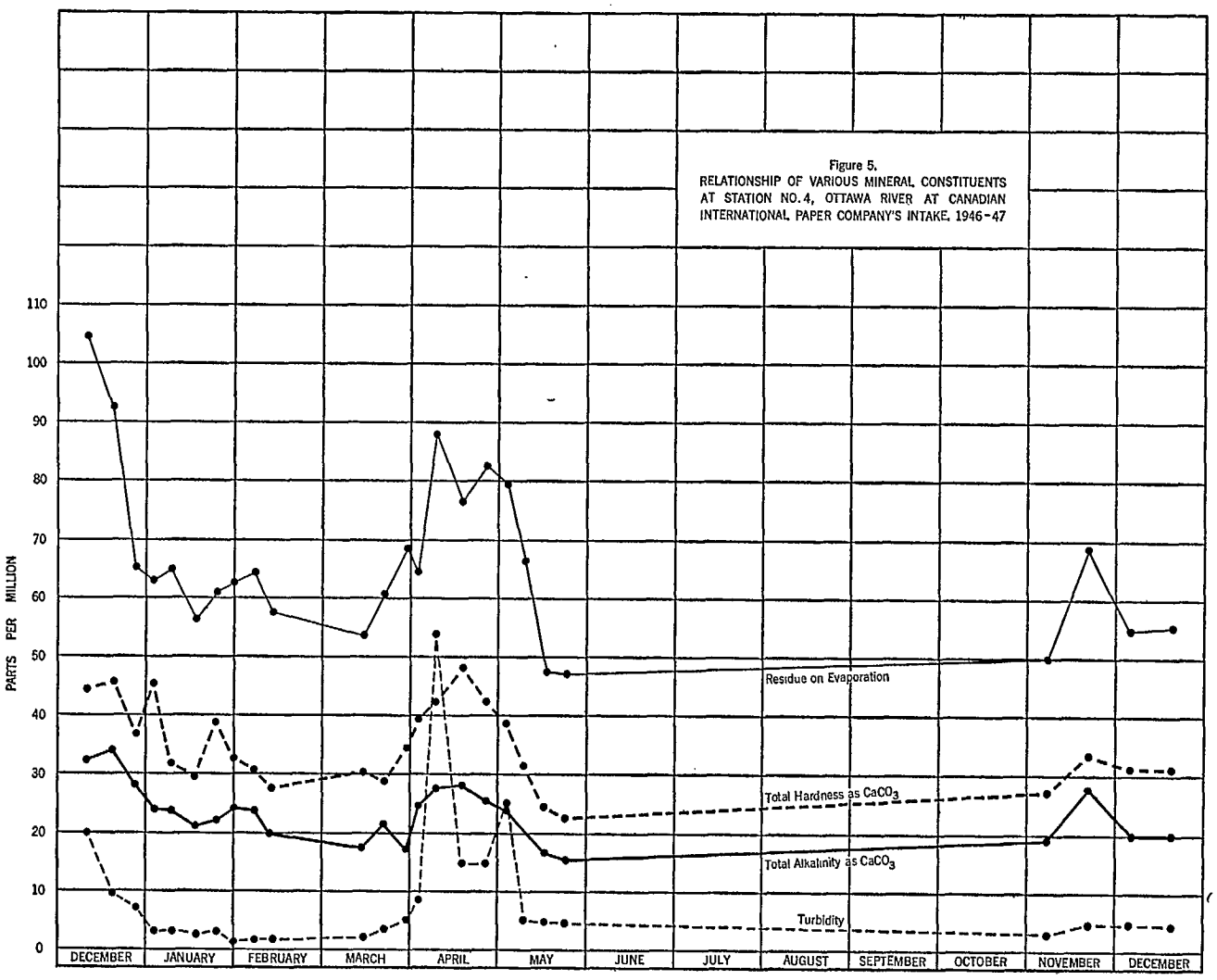

Figure 5

93295—2½

TABLE IV

Chemical Analyses of Ottawa River Water at Intake to Plant of Canadian International Paper Company, Station No. 4

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
1	Dec. 10/46	1289A	16	.....	.....	46·0	.....	.....	7·5	60	20·0	.....	.....	.....	104·5	0·1422	.....	.....	14·9
2	19*	1294	25	.....	.....	32·1	.....	.....	7·6	55	9·5	.....	.....	.....	92·5	0·1257	.....	.....	14·1
3	27	1299A	20	.....	.....	32·2	.....	.....	7·9	55	7·0	.....	.....	.....	65·5	0·0891	.....	.....	11·8
4	Jan. 3/47	1303	17	.....	.....	32·4	.....	.....	7·5	55	3·0	.....	.....	.....	63·0	0·0857	.....	.....	11·2
5	9	1306	19	.....	.....	32·4	.....	1·0	7·7	50	3·0	.....	.....	.....	65·0	0·0884	.....	.....	9·9
6	17*	1321	18	.....	.....	32·4	.....	3·0	7·4	55	2·5	.....	.....	.....	56·5	0·0768	.....	.....	9·3
7	24	1326	13	.....	.....	32·4	.....	1·2	7·5	60	3·0	.....	.....	.....	61·0	0·0830	.....	.....	10·4
8	30	1335	4	.....	.....	31·8	.....	2·5	7·6	60	1·1	.....	.....	.....	62·5	0·0850	.....	.....	9·1
9	Feb. 7/47	1344	3	.....	.....	32·4	.....	2·5	8·2	50	1·5	.....	.....	.....	64·5	0·0877	.....	.....	10·0
10	13*	1370	5	.....	.....	32·6	.....	3·9	7·1	50	1·8	.....	.....	.....	57·5	0·0782	.....	.....	8·2
	3 weekly samples not taken																		
11	Mar. 14/47	1392	12	.....	.....	32·9	.....	.....	7·4	40	2·2	.....	.....	.....	53·5	0·0728	.....	.....	9·3
12	21*	1400	9	.....	.....	32·4	.....	.....	7·1	40	3·5	.....	.....	.....	60·5	0·0823	.....	.....	7·9
13	29	1404	3	.....	.....	32·2	.....	.....	7·3	40	5·1	.....	.....	.....	68·5	0·0932	.....	.....	9·5
14	April 3/47	1408	5	.....	.....	33·3	.....	.....	7·3	45	8·6	.....	.....	.....	64·5	0·0878	.....	.....	9·3
15	9	1421	2	.....	.....	33·8	.....	.....	7·3	40	54·0	.....	.....	.....	88·0	0·1196	.....	.....	10·0
16	18*	1428	7	.....	.....	35·2	.....	.....	7·3	45	15·0	.....	.....	.....	76·5	0·1039	.....	.....	11·4
17	26	1434	3	.....	.....	38·8	.....	.....	7·4	40	15·0	.....	.....	.....	82·5	0·1121	.....	.....	10·0
18	May 3/47	1442	16	.....	.....	39·3	.....	.....	7·4	50	25·0	.....	.....	.....	79·5	0·1081	.....	.....	10·0
19	9	1451	2	.....	.....	41·0	.....	.....	7·3	50	5·2	.....	.....	.....	66·5	0·0905	.....	.....	7·9
20	16	1472	4	.....	.....	44·6	.....	.....	7·2	55	4·9	.....	.....	.....	47·6	0·0648	.....	.....	6·7
21	23*	1483	1	.....	.....	49·1	.....	.....	7·1	55	4·8	.....	.....	.....	47·4	0·0646	.....	.....	6·1
	22 weekly samples not taken																		
22	Nov. 7/47	1713	8	.....	.....	50·0	.....	1·0	7·0	60	2·9	.....	.....	52·25	50·0	0·0680	.....	20·0	6·4
	1 weekly sample not taken																		
23	21*	1730	5	.....	.....	40·1	.....	1·2	6·8	50	4·7	.....	.....	76·34	68·8	0·0935	.....	24·6	9·4
	1 weekly sample not taken																		
24	Dec. 5/47	1766	28	.....	.....	32·9	.....	.....	7·1	50	4·8	.....	.....	56·54	54·8	0·0746	.....	23·2	8·1
	1 weekly sample not taken																		
25	19	1771	14	.....	.....	32·0	.....	.....	7·2	60	4·4	.....	.....	58·41	55·2	0·0751	.....	21·8	8·5
26	Maximum values		28	.....	.....	50·0	.....	.....	8·2	60	54·0	.....	.....	.....	104·5	0·1426	.....	.....	14·9
27	Minimum values		1	.....	.....	31·8	.....	.....	6·8	40	1·1	.....	.....	.....	47·4	0·0646	.....	.....	6·1
28	Average values.	25 samples	10·4	.....	.....	36·1	.....	.....	7·4	50·8	8·5	.....	.....	60·89 4 samples	66·3	0·0902	.....	22·4 4 samples	9·6

* Monthly samples included in the average of twelve samples in Table VI, pages 22-23.

TABLE IV—Concluded

Chemical Analyses of Ottawa River Water at Intake to Plant of Canadian International Paper Company, Station No. 4—Concluded

(In parts per million)

Magnesium (Mg)	Alkalis as sodium: Sodium (Na)	Alkalis as sodium: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
1·7	3·0	.....	.....	0·48	.....	.....	0·03	13·6	0	7·0	.....	.....	0	39·3	0	16·5	.....	12·0	44·2	8·74	.....	.....	1·3	1
2·6	2·4	.....	.....	0·25	.....	.....	0·13	14·4	0	3·4	.....	.....	0	41·5	0	14·5	.....	11·9	45·9	5·42	.....	.....	1·0	2
1·7	2·0	.....	.....	0·04	.....	.....	0·03	8·2	0	5·3	.....	.....	0	34·2	0	1·5	.....	8·4	36·4	6·94	.....	.....	1·1	3
4·2	0·3‡	.....	.....	0·06	.....	.....	0	7·8	0	5·3	.....	.....	0	28·9	0	2·0	.....	21·6	45·3	2·67	.....	.....	1·5	4
1·7	0·3	.....	.....	0·02	.....	.....	0	5·8	0	3·5	.....	.....	0	28·8	0	2·0	.....	8·1	31·7	5·82	.....	.....	1·3	5
1·5	1·4	.....	.....	0·05	.....	.....	0	8·2	0	5·5	.....	.....	.....	25·6	0	3·0	.....	8·4	29·4	6·20	.....	.....	1·6	6
3·1	1·5‡	.....	.....	0·06	.....	.....	0	7·4	0	4·4	.....	.....	.....	26·8	0	5·5	.....	16·8	38·8	3·35	.....	.....	1·5	7
2·4	1·4	.....	.....	0·05	.....	.....	0	7·8	0	4·4	.....	.....	.....	29·3	0	1·5	.....	8·6	32·6	3·79	.....	.....	1·5	8
1·3	2·3	.....	.....	0·08	.....	.....	0	7·0	0	5·3	.....	.....	.....	29·0	0	1·0	.....	6·6	30·4	7·69	.....	.....	0·9	9
1·7	2·0	.....	.....	0·05	.....	.....	0·001	6·2	1·4	4·4	.....	.....	.....	24·0	0	0·5	.....	7·8	27·5	4·82	.....	.....	2·3	10
1·7	2·5‡	.....	.....	0·06	.....	.....	0	7·8	0	3·5	.....	.....	.....	21·0	0	5·5	.....	13·0	30·2	5·47	.....	.....	1·8	11
2·2	3·2	.....	.....	0·08	.....	.....	0	11·1	0	4·0	.....	.....	.....	26·1	0	4·0	.....	7·4	28·8	3·59	.....	.....	1·9	12
2·8	0·6	.....	.....	0·08	.....	.....	0	11·9	0	3·5	.....	.....	.....	20·7	0	4·5	.....	17·2	34·2	3·39	.....	.....	1·9	13
3·9	0·9	.....	.....	0·05	.....	.....	0	11·9	0	5·3	.....	.....	.....	30·0	0	5·5	.....	14·7	39·3	2·38	.....	.....	1·7	14
4·2	5·4	.....	.....	0·12	.....	.....	0	14·0	0	4·4	.....	.....	.....	33·7	0	15·0	5·0	14·7	42·3	2·38	.....	.....	1·7	15
4·8	3·3‡	.....	.....	0·07	.....	.....	0	9·1	0	3·5	.....	.....	.....	34·2	0	9·5	9·0	20·2	48·2	2·38	.....	.....	1·4	16
4·2	4·7	.....	.....	0·08	.....	.....	0	13·6	0	3·5	.....	.....	.....	30·7	0	8·5	6·4	17·1	42·3	2·38	.....	.....	1·6	17
3·3	5·7	.....	.....	0·07	.....	.....	0	14·0	0	2·7	.....	.....	.....	29·3	0	11·5	6·1	14·6	38·6	3·03	.....	.....	1·6	18
2·8	13·0	.....	.....	0·14	.....	.....	0	17·7	0	2·7	.....	.....	.....	36·4	0	7·0	5·5	1·4	31·2	2·82	.....	.....	1·8	19
1·9	5·3	.....	.....	0·02	.....	.....	0	6·9	0	2·2	.....	.....	.....	20·5	0	5·2	6·2	7·7	24·5	3·53	.....	.....	2·2	20
1·8	4·7	.....	.....	0·04	.....	.....	0	6·6	0	3·1	.....	.....	.....	18·8	0	8·6	4·9	7·2	22·6	3·39	.....	.....	2·2	21
2·7	1·8	.....	.....	0·26	.....	.....	0	10·1	0	0·89	.....	.....	.....	23·2	0	4·0	4·2	8·1	27·1	2·37	.....	.....	2·4	22
2·4	5·7	.....	.....	0·39	.....	.....	0·006	13·5	0	0·44	.....	.....	.....	33·9	0	6·0	4·2	5·5	33·3	3·92	.....	.....	2·1	23
2·6	2·7	.....	.....	0·38	.....	.....	0	8·4	0	1·6	.....	.....	.....	24·4	0	4·8	4·0	11·1	31·1	3·12	.....	.....	2·2	24
2·4	4·4	.....	.....	0·26	.....	.....	0	11·4	0	1·3	.....	.....	.....	24·4	0	5·4	4·4	11·1	31·1	3·54	.....	.....	1·9	25
4·8	13·0	.....	.....	0·48	.....	.....	0·13	17·7	1·4	7·0	.....	.....	.....	41·5	0	16·5	.....	21·6	48·2	8·74	47·5	.....	2·4	26
1·3	0·3	.....	.....	0·02	.....	.....	0	6·2	0	0·44	.....	.....	0	18·8	0	0·5	.....	1·4	22·6	2·37	1·4	.....	0·9	27
2·6	3·2	.....	.....	0·13	.....	.....	0·008	10·2	0	3·6	.....	.....	.....	28·6	0	6·1	5·4 (11 samples)	11·2	34·7	3·69	16·7	.....	1·7	28

‡ Values calculated.

TABLE V

Chemical Analyses of Ottawa River Water Below Mouth of Rideau River at New Edinburgh Canoe Club, Station No. 5

(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 K x 10⁶ at 25°C.	Residue on Evaporation (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	Tons per day		
1	Dec. 1946.....	No samples taken																	
2	Jan. 1947.....																		
3	Feb. 1947.....																		
4	Mar. 1947.....																		
5	April 18/47.....	1427	7	.....	.....	.....	.....	.....	7·3	45	15·0	.....	.....	.....	92·5	0·1256	.....	.....	15·7
6	25.....	1433	11	.....	.....	.....	.....	.....	7·4	45	6·0	.....	.....	.....	86·5	0·1176	.....	.....	13·6
7	May 9/47.....	1450	1	.....	.....	.....	.....	.....	7·6	50	5·2	.....	.....	.....	82·5	0·1122	.....	.....	8·6
8	Average.....	3 samples	6·3	.....	.....	.....	.....	.....	7·4	47	8·7	.....	.....	.....	87·1	0·1184	.....	.....	12·6

TABLE VI

Average Analyses of River Waters at Ottawa

(In parts per million)

No.	No. of samples averaged	Source of samples	Storage period (Days)	Water temperature (°F)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter		Specific conductance K x 10⁶ at 25°C	Residue on evaporation (Dissolved solids)			Loss on ignition at 550°C.	Calcium (Ca)
										Dried at 105°C	Ignited at 550°C		P.P.M.	Tons per acre-foot	Tons per day		
1	30	Ottawa River at Station No. 1.....	9·7	41·4	.....	.....	7·3	48·8	5·7	.....	.....	.....	70·8	0·0963	.....	.....	10·5
2	6	" "	.....	.....	.....	.....	.....	.....	.....	.....	.....	67·65	.....	.....	.....	.....	.....
3	25	" "	.....	.....	.....	.....	7·3	48·4	5·9	.....	.....	.....	72·7	0·0989	.....	.....	11·0
4	12	" "	10·8	.....	.....	.....	7·3	49·4	6·2	.....	.....	.....	68·6	0·0864	.....	.....	10·1
5	52	" "	12·3	.....	.....	.....	7·3	50·1	5·2	.....	.....	.....	67·1	0·0912	.....	.....	9·7
6	30	Rideau River at Station No. 2.....	10·9	.....	.....	.....	7·8	53·1	6·6	.....	.....	.....	196·0	0·267	.....	.....	41·1
7	6	" "	.....	.....	.....	.....	.....	.....	.....	.....	.....	263·0	.....	.....	.....	.....	.....
8	25	" "	9·4	37·9	.....	.....	7·8	52·4	7·5	.....	.....	.....	199·0	0·271	.....	.....	41·7
9	12	" "	11·4	.....	.....	.....	7·8	54·2	3·4	.....	.....	.....	190·4	0·259	.....	.....	40·3
10	52	" "	13·1	.....	.....	.....	7·8	51·2	4·7	.....	.....	.....	186·9	0·254	.....	.....	39·8
11	25	Gatineau River at Station No. 3.....	9·8	37·8	.....	.....	7·6	53·2	5·4	.....	.....	38·96	55·4	0·0753	.....	.....	8·7
12	12	" "	7·3	.....	.....	.....	7·3	50·8	3·1	.....	.....	.....	46·8	0·0636	.....	.....	6·6
13	25	Ottawa River at Station No. 4.....	10·4	36·1	.....	.....	7·4	50·8	8·5	.....	.....	60·89	66·3	0·0902	.....	.....	9·6
14	12	" "	7·8	.....	.....	.....	7·1	53·3	5·0	.....	.....	.....	58·7	0·0789	.....	.....	8·2
15	3	Ottawa River at Station No. 5.....	6·3	.....	.....	.....	7·4	47·0	8·7	.....	.....	.....	87·1	0·1184	.....	.....	12·6

NOTE:—For location of various stations see Figure 1, page 8.

TABLE V—Concluded

Chemical Analyses of Ottawa River Water Below Mouth of Rideau River at New Edinburgh Canoe Club, Station No. 5—Concluded

(In parts per million)

Magnesium (Mg)	Alkalis as sodium: Sodium (Na)	Alkalis as sodium: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
																								1
																								2
																								3
																								4
5·5	2·9		.....	0·05	.....	.....	0	15·6	0	3·5	.....	.....	.....	49·8	0	8·5	5·0	21·0	61·8	2·85	.....	.....	1·3	5
6·3	3·6		.....	0·05	.....	.....	0	17·3	0	3·1	.....	.....	.....	45·6	0	4·5	5·8	22·4	59·8	2·16	.....	.....	1·4	6
3·7	11·3		.....	0·12	.....	.....	0	19·3	0	2·7	.....	.....	.....	37·1	0	6·0	5·2	6·3	36·7	2·32	.....	.....	1·6	7
5·2	5·9		.....	0·07	.....	.....	0	17·4	0	3·1	.....	.....	.....	44·2	0	6·3	5·3	16·6	52·8	2·44	19·5	.....	1·4	8

TABLE VI—Concluded

Average Analyses of River Waters at Ottawa—Concluded

(In parts per million)

Magnesium (Mg)	Alkalis as sodium: Sodium (Na)	Alkalis as sodium: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
3·0	3·4		.....	0·12	.....	.....	0·79	11·9	0	3·4	.....	.....	.....	31·4	0	5·4	.....	13·0	38·4	3·50	16·1	.....	1·7	1
.....	.....		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
3·1	3·4		.....	0·10	.....	.....	0	12·5	0	3·5	.....	.....	.....	31·9	0	5·6	.....	13·5	39·6	3·55	15·5	.....	1·6	3
2·7	3·0		.....	.....	.....	.....	.....	10·8	0	2·7	.....	.....	.....	29·8	0	5·9	.....	12·1	36·5	3·96	15·3	.....	.....	4
2·9	3·3		.....	.....	.....	.....	.....	11·0	0	2·9	.....	.....	.....	29·3	0	5·7	.....	12·4	36·4	3·35	16·6	.....	1·7	5
13·2	5·4		.....	0·15	.....	.....	0·04	24·6	0·8	3·6	.....	.....	.....	154·8	0	6·2	.....	29·8	156·7	3·11	7·0	0·1	.....	6
.....	.....		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
13·4	5·8		.....	0·14	.....	.....	0·04	27·0	1·0	4·0	.....	.....	.....	154·2	0	6·5	.....	32·2	158·5	3·11	7·3	0·1	.....	8
12·8	5·0		.....	.....	.....	.....	.....	20·3	.....	2·7	.....	.....	.....	155·1	0	.....	.....	24·7	151·9	3·16	6·6	.....	.....	9
12·8	4·7		.....	.....	.....	.....	.....	20·3	.....	2·3	.....	.....	.....	159·8	0	5·1	.....	24·8	155·8	3·11	6·3	0·12	.....	10
2·1	2·6		.....	0·13	.....	.....	0	8·9	0	3·9	.....	.....	.....	23·9	0	4·7	5·2	10·8	30·4	4·14	15·7	.....	1·7	11
1·8	2·4		.....	.....	.....	.....	.....	7·0	0	2·4	.....	.....	.....	19·2	0	4·2	.....	8·2	23·9	3·67	17·9	.....	2·0	12
2·6	3·2		.....	0·13	.....	.....	0·008	10·2	0	3·6	.....	.....	.....	28·6	0	6·1	5·4	11·2	34·7	3·69	16·7	.....	1·7	13
2·4	3·3		.....	.....	.....	.....	.....	9·2	0	2·8	.....	.....	.....	25·6	0	.....	.....	8·9	29·9	3·41	19·2	.....	2·0	14
5·2	5·9		.....	0·07	.....	.....	0	17·4	0	3·1	.....	.....	.....	44·2	0	6·3	5·3	16·6	52·8	2·44	19·5	.....	1·4	15

In Table VII an attempt is made to determine from the data available the effect, if any, of the Gatineau River on the lower Ottawa River at Station No. 4. This is difficult to show because of the similar character of the waters of the two rivers and because of many factors such as inherent errors in analytical methods, changing winds, and daily fluctuations in either river. There is also some indication that at times Rideau River may influence the water at Station No. 4. However, on the basis of the calcium, sulphate, total hardness, and total alkalinity values, and assuming no Rideau River water present, it is indicated that about 50 to 55 per cent of the water at Station No. 4 is Gatineau River water, but that this percentage will vary day by day.

Table VIII is a summary of an analysis of the average data of Table VI using the Palmer System of Classification.[1] The table shows that this system of classification quickly indicates the similarity of water quality in all the rivers except Rideau River. It does not, however, indicate the relative hardness, etc., as even the Rideau is classed similarly to Ottawa and Gatineau Rivers as a Class III water with primary and secondary alkalinity.

Calcium-magnesium ratios were calculated in many analyses and are reported in the tables. The constancy of this ratio in the analyses of such low mineralized waters as Ottawa and Gatineau Rivers is surprising. This ratio is very constant in Rideau River, despite overall greater fluctuations in the flow and total content of dissolved solids.

The saturation index ($pH - pH_s$) was also determined for these waters and the constancy of pH_s was quite surprising. Ottawa and Gatineau Rivers generally have a fairly constant index, but the Rideau River index changes from negative to positive and vice versa. Normally it is positive—that is, on the scale-forming side—as would be expected. In contrast, the Gatineau and Ottawa waters are somewhat corrosive in nature.

Per cent sodium, that is, the percentage of sodium to all cations, has been calculated for the average waters and for the extremes in each river. This value is important in determining the usefulness of a water for irrigation. If the per cent sodium is greater than a certain value, depending upon the total concentration of dissolved salts, the water may not be satisfactory for that purpose.[2] Attention is drawn to the fact that although the true

TABLE VII

Effect of Gatineau River on Lower Ottawa River at Station No. 4

Percentage, Gatineau River in Lower Ottawa River at Station No. 4

Type of analysis	Based on 25 sample averages				Based on 12 sample averages			
	Station No. 1	Station No. 3	Station No. 4	Per cent Gatineau River	Station No. 1	Station No. 3	Station No. 4	Per cent Gatineau River
pH	7·3	7·6	7·4	33·3	7·3	7·3	7·1	.....
Colour	48·4	53·2	50·8	50·0	49·4	50·8	58·3	.....
Turbidity	5·9	5·4	8·5	.....	6·2	3·1	5·0	38·7
Residue on evaporation	72·7	55·4	66·3	37·0	68·6	46·8	58·7	45·4
Calcium	11·0	8·7	9·6	60·8	10·1	6·6	8·2	54·3
Magnesium	3·1	2·1	2·6	50·0	2·7	1·8	2·4	33·3
Alkalis as Na	3·4	2·6	3·2	25·0	3·0	2·4	3·3	.....
Sulphate	12·5	8·9	10·2	63·9	10·8	7·0	9·2	42·1
Nitrate	3·5	3·9	3·6	25·0	2·7	2·4	2·8	.....
Carbonate hardness as $CaCO_3$ (total alkalinity)	26·1	19·6	23·5	40·1	24·4	15·7	21·0	39·1
Total hardness as $CaCO_3$	39·6	30·4	34·7	53·3	36·5	23·9	29·9	52·4
Ca/Mg ratio	3·6	4·1	3·7	20·0	4·0	3·7	3·4	.....

NOTE: It is assumed that the Rideau River has no effect here, which is probably not true at times of flood or under certain wind conditions. This could partly account for the wide variations.

per cent sodium is $\frac{Na}{K + Na + Ca + Mg} \times 100$ this is calculated only when potassium has been determined, as in later survey work. Thus, the per cent sodium shown here is, total alkalis expressed as sodium $\times$ 100 $\div$ total cations. All these river waters are relatively low in total solids and in per cent sodium. It will be noted that Rideau River is very low in sodium in relation to the other waters studied.

[1] Department of the Interior, United States Geological Survey, Bulletin 479. The Geochemical Interpretation of Water Analyses by Chase Palmer; *See also* Water Survey Report No. 1, Mines Branch Report No. 833, Dept. of Mines and Technical Surveys, Ottawa.
[2] Explanation and Interpretation of Analyses of Irrigation Waters; United States Department of Agriculture Circular No. 784, May 1948.

The lack of chloride and nitrite in the upper Ottawa River is of interest. The lower Ottawa, at least on the Quebec side, is also surprisingly free of chlorides and nitrites considering the contamination and industrial waste that is probably entering the river between Stations No. 1 and No. 4. The sample of February 13 may be in error, although the presence of nitrite would indicate possible pollution from some source on that day. The Rideau River, after flowing through the city, definitely is contaminated on the basis of the chloride and nitrite contents, especially during winter and spring. The Gatineau on this basis is a pure stream showing no chlorides and only occasional nitrite traces.

TABLE VIII

Palmer Classification of Rivers at Ottawa

	Station No. 1 (30 samples)			Station No. 2 (30 samples)			Station No. 3 (25 samples)			Station No. 4 (25 samples)		
	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
Primary salinity..... %	23·2	2·5	16·4	9·2	2·4	6·9	22·9	7·0	15·8	28·0	3·2	15·5
Secondary salinity..... %	12·5	29·2	16·8	15·8	8·6	10·8	11·1	24·8	18·2	0	29·0	16·6
Total salinity..... %	35·7	31·7	33·2	25·0	11·0	17·7	34·0	31·8	34·0	28·0	32·2	32·1
Primary alkalinity..... %	0	0	0	0	0	0	0	0	0	5·0	0	0
Secondary alkalinity... %	64·3	68·3	67·0	75·0	89·0	82·3	66·0	68·2	66·0	67·0	67·8	67·9
Total alkalinity..... %	64·3	68·3	67·0	75·0	89·0	82·3	66·0	68·2	66·0	72·0	67·8	67·9
Palmer classification.....	III	III	III	III	III	III	III	III	III	I	III	III

PART II

QUALITY OF SURFACE WATERS IN THE OTTAWA RIVER DRAINAGE BASIN, 1947-48

Sampling was begun in May 1947, at twenty-six locations on Ottawa River and its tributaries. The survey procedure followed was similar to that outlined above and given in detail in Water Survey Report No. 1. Field sampling and testing of additional surface water samples and civic water supplies was done during the summer of 1947. A few spot samples taken since 1947 are included in this report.

The sampling stations, both for monthly and spot samples, are listed in Appendix A and shown in Figure 6 (in pocket).

As these studies were made during a period when both field and laboratory procedures were being clarified, some changes, already noted, were made in methods of analysis, number of determinations, etc., during the course of the survey. These changes must be kept in mind when interpreting the results reported below.

Occasionally, when waters have shown little change over several months, the extent of analysis carried out was decreased and only sufficient tests were done to indicate whether or not the water was remaining relatively constant.

DISCUSSION

The analytical data obtained on the waters sampled at each station are given in Table IX. The values in brackets are results obtained immediately when samples were tested in the field, except per cent sodium, in regard to which values in brackets refer to calculation of true per cent sodium and not to per cent alkalis.

Whenever monthly analyses have been carried out, or whenever several analyses are available on a water over the yearly period, averages are calculated. In calculating these averages all values determined directly, such as colour, calcium and iron, are arithmetical means or averages, but in the cases of those values determined by calculation—for example, hardness, saturation index, etc.—the average value is determined directly by calculation from the mean basic values of the twelve monthly samples.

Table IX shows wide variations in the character of many of the waters over the year period 1947-48. At many locations samples were also taken later than 1948 and these should be compared with samples taken previously at the same point and at about the same time of the year.

Figure 7 shows the variation in hardness of the Ottawa River proceeding downstream. It will be noted that rivers entering from the clay belt, such as Blanche River, increase the hardness, but that Lake Timiskaming seems to cause a decrease. Tributary waters entering below Lake Timiskaming down to near Ottawa, generally from sources in the Laurentian Highlands, are soft and highly coloured so that there is little change in the water until the entrance of harder waters (Rideau and South Nation Rivers) draining from the clay area near Ottawa causes some increase in hardness.

No attempt is made at this time to study in detail all the differences in these surface waters shown by the data presented. It is apparent, however, that the whole drainage basin, except for the clay belt areas near New Liskeard and southeast of Ottawa, has an abundance of a relatively soft, highly coloured water that in many cases shows only minor seasonal variations.

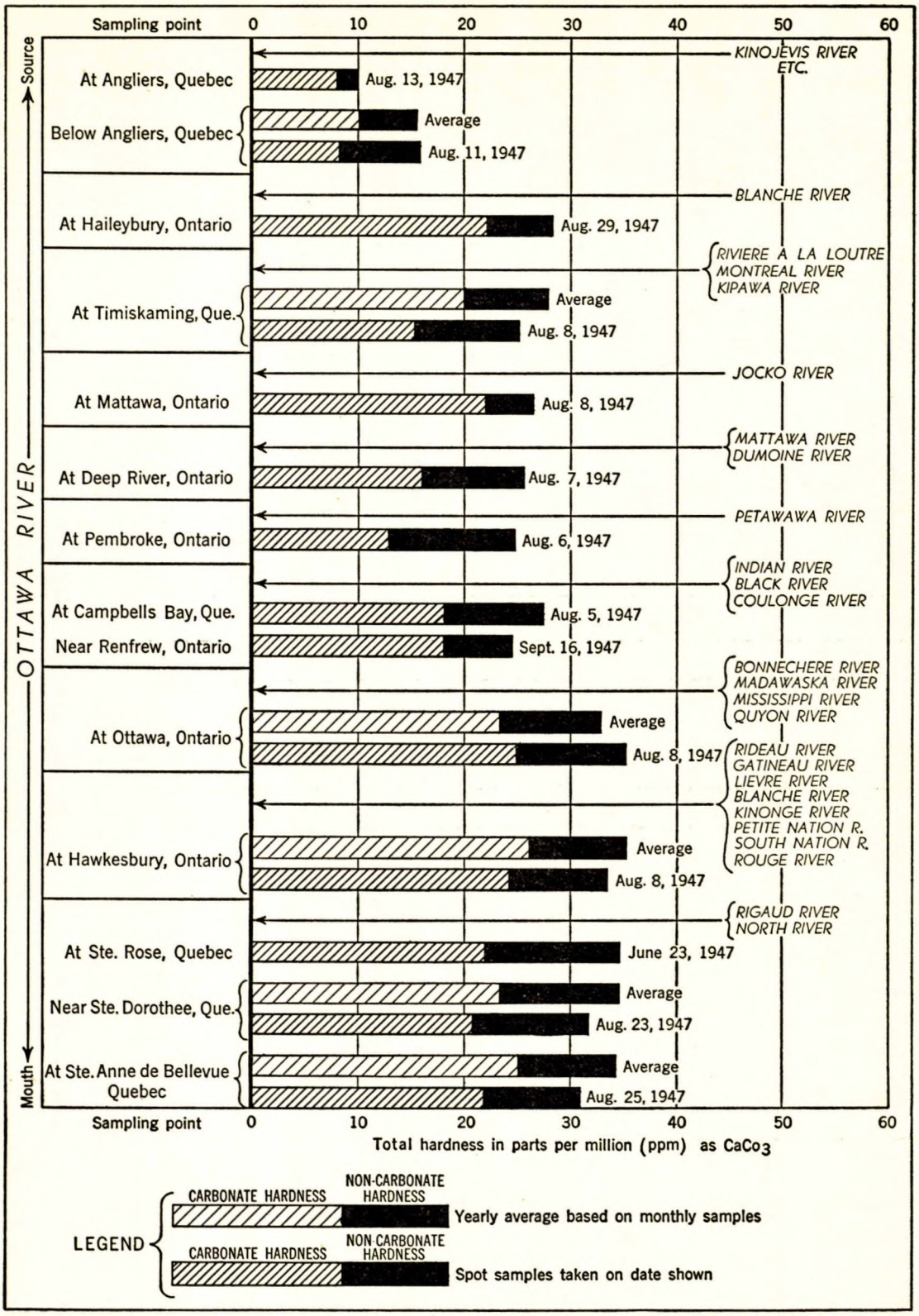

Figure 7. Graph showing change in hardness along Ottawa River watershed

TABLE IX

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
																			STATION No. 1: ST. LAWRENCE
1	Feb. 6/48	2329	238			33·8			8·4	14	0·8			302·6					40·5
2	Mar. 30	2444	219			37·0			9·1	10	Green algae growth			226·8	149·4	0·203		55·2	30·0
3	April 2	2486	229			39·0			9·1	7	Green algae growth			176·6	115·2	0·157		24·2	18·8
4	May 1948	No samples taken																	
5	June 10/48	2372	125			58·0			8·1	14	3·7			277·8					37·0
6	July																		
7	Aug.																		
8	Sept.	No samples taken																	
9	Oct.																		
10	Nov.																		
11	Dec. 22/48	2618	12			40·0			8·0	2	2·5			285·3	175·4	0·2385		24·2	36·4
12	Average (5 samples)		164·6			41·6			8·5	11	2·3			253·8	146·7	0·199			32·5
																			STATION No. 2: ST. LAWRENCE
13	June 19/47	1528*	5			60·8	(8·0)	(2·5)	7·9 (7·9)	40 (60)	9·6				181·2	0·246		70·4	33·8
14	Mar. 17/49	2887	15						7·9	0	0·8			281·3	167·8	0·228		47·2	37·2
																			STATION No. 3: ST. LAWRENCE AND
	1945																		
15	Average*					49				32	9								
16	Maximum					70				51	16								
17	Minimum					32				14	5								
18	Feb. 20/47	1376						4·5	7·6	20					133·0	18·1			29·3
																			STATION No. 4: ST. LAWRENCE-OTTAWA
19	June 20/47	1529	3			64·4	(9·0)	(4·0)	7·1 (7·6)	45 (75)	3·3				61·4	0·0835		25·4	8·7
20	Mar. 16/49	2885	16						7·2	35	3·0			98·2	83·0	0·113		31·2	11·2
																			STATION No. 5: ST. LAWRENCE-OTTAWA
21	Average 1942					45			7·3	59	20								
22	1943					45			7·0	55	30								
23	1944	From Dorval filtration plant records				45		6	7·0	50	25								
24	1945					45		7	6·9	55	30								
25	1946					45		6	6·8	55	28								
26	June 18/47	14				67·1		3·0	7·3	55									
27	April 23/49	3129	26						7·2	35	30	42·2	34·4	106·1	81·6	0·111		23·0	13·6

* Yearly average of monthly samples composited from daily samples; data supplied by Montreal filtration plant.

Note.—Stations Nos. 1 and 2 on St. Lawrence River are included for comparison purposes.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
RIVER AT LONGUEUIL, QUE.																								
9·6	8·7	1·6	.....	.....	.....	.....	.....	.....	17·5	.....	.....	.....	.....	112·2	2·4	.....	7·4	44·7	140·7	4·22	13·0	0·62	.....	1
7·8	6·5	1·6	.....	.....	0·05	.....	.....	17·5	12·9	0	0·10	.....	.....	72·2	9·6	3·6	1·9	31·7	106·9	3·84	13·2	1·0	.....	2
5·2	6·2	2·0	.....	.....	0·02	.....	.....	26·4	7·9	0	0·16	.....	.....	45·2	9·6	7·8	10·0	15·3	68·3	3·62	19·0	0·64	.....	3
																								4
8·2	7·5	1·3	.....	.....	.....	.....	.....	.....	15·8	.....	.....	.....	.....	115·5	0	.....	2·4	34·7	126·1	4·51	12·5	0·17	.....	5
																								6
																								7
																								8
																								9
																								10
8·8	8·0	1·4	.....	.....	0·15	.....	.....	26·3	18·0	0·62	0·06	.....	.....	119·8	0	2·4	1·0	29·0	127·0	4·14	13·1	0·03	.....	11
7·9	7·4	1·6	.....	.....	.....	.....	.....	23·4	14·4	.....	.....	.....	.....	92·98	4·3	.....	4·5	31·1	113·8	4·12	13·8	0·55	.....	12
RIVER AT ST. LAMBERT, QUE.																								
7·8	6·4		.....	0·73	.....	.....	.....	23·7	9·9	3·5	.....	.....	.....	101·3 (97·6)	0 (0)	9·6	2·9	33·4	116·4	4·33	.....	.....	0·02	13
8·2	7·7	1·2	.....	.....	0·07	.....	.....	26·0	17·6	0·35	0·15	.....	.....	112·4	0	4·0	3·6	34·6	126·6	4·54	12·6	.....	0·02	14
OTTAWA RIVERS AT MONTREAL, QUE.																								
																								15
																								16
																								17
6·3	10·6		.....	0·08	.....	.....	.....	19·3	10·4	4·0	.....	.....	.....	83·2	0	2·5	.....	29·2	99·0	4·65	18·9	.....	0·45	18
RIVER (LAKE ST. LOUIS) AT LACHINE, QUE.																								
2·8	2·7		.....	0·32	.....	.....	.....	8·9	0	1·8	.....	.....	.....	27·8 (26·8)	0 (0)	6·6	3·4	10·4	33·2	3·15	15·0	.....	1·9	19
3·4	2·3	1·0	.....	.....	0·24	.....	.....	15·0	1·5	2·2	0·15	.....	.....	39·0	0	7·8	5·6	10·0	42·0	3·29	13·1	.....	1·7	20
RIVER (LAKE ST. LOUIS) AT DORVAL, QUE.																								
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41·5	0	.....	.....	6	40					21
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36·6	0	.....	.....	8	38					22
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36·6	0	.....	.....	10	40	As soap-consuming power				23
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34·2	0	.....	.....	14	42					24
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	43·9	0	.....	.....	4	40					25
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32·5	0	.....	.....	.....	.....	.....	.....	.....	.....	26
3·8	2·0	1·0	.....	1·6	0·2	.....	.....	13·3	0	0·8	0·2	.....	.....	46·4	0	5·8	6·0	11·5	49·5	3·60	10·2	.....	1·6	27

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
																			STATION No. 6: OTTAWA RIVER
1	May 26/47.....	1488	1	Level** 78·85	Level** 78·21	.....	.....	.....	7·1	60	8·1	.....	.....	.....	83·2	0·113	.....	.....	9·7
2	June 25.....	1561	8	77·28	77·83	.....	.....	.....	7·0	45	5·7	.....	.....	.....	63·0	0·086	.....	21·0	7·6
3	July 25.....	1607	17	72·03	73·40	.....	.....	.....	6·8	55	4·0	.....	.....	.....	71·8	0·098	.....	28·0	10·3
4	Aug. 25.....	1649	21	70·77	71·42	.....	.....	.....	6·7	50	2·3	.....	.....	.....	61·6	0·084	.....	28·0	8·6
5	Sept. 25.....	1683	27	71·23	70·91	.....	.....	.....	7·0	40	10·1	.....	.....	68·44	66·8	0·091	.....	23·8	8·8
6	Oct. 27.....	1719	25	70·63	70·89	.....	.....	.....	7·0	60	5·1	.....	.....	64·57	62·4	0·085	.....	23·2	8·0
7	Nov. 25.....	1750	10	70·74	70·72	.....	.....	.....	7·1	60	6·0	.....	.....	74·25	67·6	0·092	.....	23·8	8·8
8	Dec. 23.....	1796	36	70·95	70·93	.....	.....	.....	7·1	50	5·1	.....	.....	71·94	60·6	0·082	.....	25·4	8·8
9	Jan. 26/48.....	1814	22	71·11	71·07	.....	.....	.....	7·0	60	5·8	.....	.....	65·56	64·2	0·087	.....	26·6	8·0
10	Feb. 23.....	1838	4	70·78	71·08	.....	.....	.....	6·8	45	3·6	.....	.....	69·63	68·0	0·092	.....	33·0	8·0
11	Mar. 24.....	1884	0	74·56	72·01	.....	.....	.....	6·8	40	36·5	.....	.....	80·85	96·6	0·131	.....	35·0	9·6
12	April 26.....	1965	15	74·04	73·58	.....	.....	.....	7·1	50	8·0	.....	.....	89·98	84·0	0·114	.....	51·8	11·1
13	May-Dec.....	No samples taken																	
14	Jan. 25/49*....	2740	16	71·16	70·88	.....	.....	.....	7·0	35	4·0	2·8	0·6	98·00	73·8	0·100	.....	31·4	8·6
15	Average (26/5/47 to 26/4/48) (12 samples)....		15·5	72·75	72·67	.....	.....	.....	6·96	51·2	8·4	.....	.....	73·15	70·8	0·096	.....	29·1	8·9
																			STATION No. 7: OTTAWA
16	Feb. 21/47.....	1377	4	.....	.....	.....	(9·1)	(4·4)	7·3	55	4·5	.....	.....	.....	91·5	0·124	.....	.....	17·9
17	June 17/47.....	1516	6	.....	.....	65·3	(8·6)	(1·0)	7·1 (7·5)	55 (90)	3·0	.....	.....	.....	65·0	0·088	.....	23·0	8·3
																			STATION No. 8: RIVIÈRE DES
18	May 13/47.....	1463	7	96,400	97,000	.....	.....	.....	6·5	45	6·1	.....	.....	.....	63·2	0·086	16,415	.....	8·3
19	No sample taken in June																		
20	July 24.....	1605	18	42,000	53,800	.....	.....	.....	6·9	55	13·6	.....	.....	.....	101·2	0·138	11,476	30·0	10·6
21	Aug. 23.....	1640	16	32,200	34,600	.....	.....	.....	6·7	55	5·6	.....	.....	.....	67·2	0·091	7,603	29·4	8·4
22	Sept. 24.....	1677	21	32,200	29,800	.....	.....	.....	7·0	60	3·0	.....	.....	69·74	76·0	0·103	8,606	51·0	9·0
23	Oct. 24.....	1716	22	29,600	29,300	.....	.....	.....	6·5	60	5·0	.....	.....	68·97	69·8	0·095	5,568	27·8	8·4
24	Nov. 24.....	1774	53	28,900	24,200	.....	.....	.....	7·2	50	8·1	.....	.....	75·13	71·6	0·097	5,551	23·2	9·2
25	Average (6 samples).....		22·8	43,550	44,783	.....	.....	.....	6·8	54·1	6·9	.....	.....	71·28	74·8	0·102	9,203	32·3	·0

* Not included in average. ** Elevations are in terms of Georgian Bay Ship Canal Survey levels of instrumental value.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: ±	Saturation index: −	No.
AT MOUTH (STE. ANNE'S CANAL)																									
3·0	3·1		.....	0·80	.....	.....	0	8·7	0	2·7	.....	.....	.....	32·0	0	12·4	5·0	10·3	36·5	3·23	15·6	.....	1·8		1
3·0	2·1		.....	0·45	.....	.....	0	10·0	0	2·2	.....	.....	.....	27·1	0	7·6	4·2	9·1	31·3	2·53	12·7	.....	2·1		2
2·9	3·2		.....	0·29	.....	.....	0	9·2	0	2·7	.....	.....	.....	35·1	0	7·8	1·6	8·9	37·7	3·55	15·6	.....	2·1		3
2·3	2·5		.....	0·32	.....	.....	0	10·4	0	3·1	.....	.....	.....	26·8	0	4·6	3·2	9·0	31·0	3·74	15·0	.....	2·3		4
2·6	4·7		.....	0·58	.....	.....	0	11·4	0	0·53	.....	.....	.....	28·1	0	11·6	4·8	9·7	32·7	3·38	23·8	.....	2·0		5
2·8	3·4		.....	0·38	.....	.....	0	9·1	0	0·89	.....	.....	.....	27·1	0	5·8	4·6	9·3	31·5	2·86	19·0	.....	2·1		6
2·1	4·9		.....	0·36	.....	.....	0	11·5	0	0·75	.....	.....	.....	29·5	0	5·6	4·3	6·4	30·6	4·19	25·8	.....	1·9		7
3·0	3·4		.....	0·12	.....	.....	0	12·4	0	0·62	.....	.....	.....	31·7	0	5·4	4·6	8·3	34·3	2·93	17·7	.....	1·8		8
2·8	2·5	1·0	.....	0·19	.....	.....	0·05	13·2	0	0·84	.....	.....	.....	29·3	0	5·8	4·8	7·5	31·5	2·86	17·6† (14·2)	.....	2·0		9
2·9	3·0	1·0	.....	0·19	.....	.....	0·07	11·9	0	0·89	.....	.....	.....	32·3	0	5·4	5·8	5·7	31·9	2·76	19·7 (16·4)	.....	2·2		10
3·8	2·5	4·0	.....	1·30	.....	.....	0·20	10·9	0·6	1·1	.....	.....	.....	35·6	0	18·2	3·0	10·4	39·6	2·53	19·8 (10·5)	.....	2·1		11
3·3	3·0	1·0	.....	0·71	.....	.....	0·06	11·5	0·2	1·3	.....	.....	.....	32·5	0	9·8	5·0	14·9	41·5	3·36	16·0 (13·3)	.....	1·7		12
																									13
3·7	1·7	1·2	.....	0·26	0·112	.....	.....	13·5	0·2	0	.....	.....	.....	31·7	0	4·2	3·6	10·7	36·7	2·32	18·9 (15·5)	.....	2·1		14
2·9	3·5		.....	0·47	.....	.....	.....	10·85	.....	1·47	.....	.....	.....	30·6	0	8·3	4·2	9·1	34·2	3·12	18·2	.....	2·0		15
RIVER AT DORION, QUE																									
1·3	2·8		.....	0·11	.....	.....	0·001	14·4	0	6·3	.....	.....	.....	44·0	0	5·5	.....	14·0	50·1	13·77	10·9	.....	1·2		16
2·4	3·5		.....	0·51	.....	.....	0 (0·006)	10·5	0	2·2	.....	.....	.....	29·3 (31·7)	0 (0)	6·4	4·2	6·5	30·5	3·46	19·4	.....	1·9		17
PRAIRIES NEAR STE. DOROTHÉE, QUE.																									
3·1	2·1		.....	0·12	.....	.....	0	9·5	0	2·2	.....	.....	.....	26·6	0	8·6	5·5	11·7	33·5	2·68	12·0	.....	2·6		18
																									19
3·6	5·4		.....	0·95	.....	.....	0	9·4	.....	3·1	.....	.....	.....	34·4	0	21·4	2·1	13·1	41·3	2·94	22·2	.....	2·0		20
2·6	2·3		.....	0·50	.....	.....	0	9·1	0	2·7	.....	.....	.....	26·4	0	7·6	3·6	10·1	31·7	3·23	13·7	.....	2·4		21
2·5	5·4		.....	0·76	.....	.....	0	11·4	0	1·3	.....	.....	.....	26·6	0	9·8	5·8	11·0	32·8	3·60	26·4	.....	2·0		22
3·2	3·5		.....	0·005	.....	.....	0·003	11·7	0	1·3	.....	.....	.....	26·4	0	7·8	4·0	12·5	34·1	2·63	18·25	.....	2·6		23
2·7	3·5		.....	0·54	.....	.....	0	11·5	0	1·3	.....	.....	.....	31·7	0	7·8	3·9	8·1	34·1	3·41	18·3	.....	1·8		24
2·95	3·7		.....	0·48	.....	.....	.....	10·4	0	2·0	.....	.....	.....	28·7	0	10·5	4·16	11·1	34·6	3·05	21·8	.....	2·2		25

† Value in brackets is true per cent sodium; other value is actually per cent alkalis.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 9: RIVIÈRE DES																		
1	June 19/47.....	1527	4	92,200	93,600	63·5	(9·0)	(2·5)	6·9 (7·4)	50	6·3	.....	.....	.....	67·4	0·092	16,795	28·0	9·6
2	Feb. 22/50.....	3950	6	.....	.....	.....	.....	.....	6·9	50	3·0	.....	.....	93·6	75·2	.....	.....	28·6	11·0
	STATION No. 10: RIVIÈRE DES																		
3	June 23/47.....	2028	347	34,900	35,680	68·0	(8·5)	(3·5)	..... (7·3)	..... (55)	.....	.....	.....	.....	80·2	0·109	7,532	15·6	8·8
	STATION No. 11: OTTAWA RIVER AT CANADIAN INTERNATIONAL																		
4	May 9/47.....	1462	11	251,220	249,820	44·6	.....	.....	7·2	50	20·0	.....	.....	.....	92·8	0·126	62,674	.....	8·6
5	June 8.....	1507	11	238,020	234,840	53·6	.....	.....	6·9	55	8·5	.....	.....	.....	139·4	0·190	89,543	.....	7·8
6	July 9.....	1592	20	131,760	103,970	67·1	.....	.....	6·9	60	9·3	.....	.....	.....	78·0	0·106	27,654	20·8	10·2
7	Aug. 8.....	1623	17	63,800	54,680	73·4	.....	.....	6·7	45	1·4	.....	.....	.....	62·6	0·085	10,738	31·2	8·9
8	Sept. 13.....	1665	23	44,080	44,960	71·6	.....	.....	7·5	50	3·5	.....	.....	60·94	56·0	0·076	6,633	18·4	7·7
9	Oct. 15.....	1703	26	43,400	45,400	56·3	.....	.....	6·9	40	1·9	.....	.....	61·60	56·8	0·077	6,617	22·0	7·9
10	Nov. 19.....	1748	16	44,600	43,500	41·0	.....	.....	7·0	75	5·2	.....	.....	74·03	73·6	0·100	8,831	22·8	8·8
11	Dec. 12.....	1776	35	48,300	43,400	32·8	.....	.....	7·1	50	5·0	.....	.....	76·89	68·2	0·093	8,894	24·6	9·9
12	Jan. 9/48.....	1803	27	44,300	41,400	32·0	.....	.....	6·9	45	4·4	.....	.....	69·08	61·4	0·0835	7,324	24·8	8·8
13	Feb. 12.....	1824	11	41,400	39,400	32·0	.....	.....	6·8	40	5·8	.....	.....	63·03	60·4	0·082	6,722	26·0	7·7
14	Mar. 8.....	1869	10	32,600	62,700	32·0	.....	.....	6·8	40	5·8	.....	.....	70·07	62·2	0·085	5,487	28·0	8·6
15	April 6.....	1936	15	90,100	110,000	32·0	.....	.....	7·0	60	21·0	.....	.....	109·67	112·0	0·152	27,117	36·0	17·6
16	Average (12 samples).....		18·5	89,465	89,506	47·4	.....	.....	6·98	50·8	7·65	.....	.....	73·16	76·08	0·105	22,353	34·3	9·4
17	June 9/49**...	3215	19	.....	.....	62·6	.....	3·0	7·2	40	13·0	.....	.....	81·5	.....	.....	.....	.....	8·8
	STATION No. 11A: OTTAWA																		
18	June 15/49.....	3255	28	.....	.....	69·8	.....	3·5	7·0 (7·3)	45 (60)	5·6 (5·0)	5·0	1·0	106·0	57·4	0·078	.....	33·8	8·0

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
PRAIRIES NEAR PONT VIAU, QUE.																								
2·7	2·6*		.....	0·48	.....	.....	0	9·9	0	3·5	.....	.....	.....	30·7 (32·9)	0 (0)	6·8	3·6	9·9	35·1	3·56	13·9	.....	2·0	1
2·4	1·8	0·8	.....	.....	0·32	.....	.....	17·0	0	0·4	.....	.....	.....	32·2	0	2·0	4·9	10·9	37·3	4·58	11·7 (9·3)	.....	2·7	2
MILLE ILES AT STE. ROSE, QUE.																								
3·1	.....	.....	.....	.....	.....	.....	.....	.....	0	2·2	.....	.....	.....	..... (26·8)	..... (0)	.....	7·8	..... (12·7)	34·7	2·84	.....	.....	.....	3
PAPER COMPANY'S INTAKE AT HAWKESBURY, ONT.																								
3·8	2·7		.....	1·26	.....	.....	Tr.	10·5	0	2·7	.....	.....	.....	32·2	0	18·0	5·3	10·7	37·1	2·26	13·7	.....	1·8	4
2·0	3·8		.....	0·46	.....	.....	0	9·2	0	2·2	.....	.....	.....	26·8	0	11·0	4·2	5·7	27·7	3·90	23·0	.....	2·2	5
3·3	4·3		.....	0·35	.....	.....	0	11·2	0	2·7	.....	.....	.....	36·1	0	7·8	2·0	9·4	39·0	3·09	19·3	.....	1·9	6
2·7	2·3		.....	0·23	.....	.....	0·03	8·7	0	2·7	.....	.....	.....	29·5	0	6·8	2·8	9·2	33·4	3·29	13·1	.....	2·3	7
1·1	5·7		.....	0·25	.....	.....	0·13	8·4	0	0·52	.....	.....	.....	28·3	0	4·6	3·6	0·6	23·8	7·00	34·3	.....	1·6	8
3·1	2·5		.....	0·19	.....	.....	0	13·0	0	0·62	.....	.....	.....	24·2	0	3·8	4·8	12·7	32·5	2·55	14·4	.....	2·2	9
2·5	4·8		.....	0·57	.....	.....	0	11·0	0	0·84	.....	.....	.....	32·0	0	9·6	4·3	6·1	32·3	3·52	24·5	.....	2·0	10
3·1	4·3		.....	0·28	.....	.....	0	12·2	0	1·1	.....	.....	.....	31·5	0	5·6	3·9	11·7	37·5	3·19	20·0	.....	1·8	11
3·5	3·0		.....	0·23	.....	.....	0	11·2	0	0·53	.....	.....	.....	29·8	0	5·6	4·4	12·0	36·4	2·52	15·2	.....	2·1	12
2·3	2·0	0·8	.....	0·24	.....	.....	Tr.	10·0	0	0·80	.....	.....	.....	26·8	0	6·2	4·9	6·6	28·6	3·35	15·9 (12·8)	.....	2·3	13
3·0	1·5	1·0	.....	0·17	.....	.....	0	14·3	0	0·71	.....	.....	.....	33·7	0	6·2	2·6	6·2	33·8	2·87	11·8 (8·5)	.....	2·1	14
3·9	2·5	1·0	.....	1·24	.....	.....	0·17	12·8	0	2·2	.....	.....	.....	51·2	0	16·6	3·6	18·2	60·0	4·51	10·1 (8·2)	.....	1·5	15
2·86	3·4		.....	0·46	.....	.....	.....	11·0	0	1·5	.....	.....	.....	31·8	0	8·5	3·9	9·1	35·2	3·24	17·3	.....	1·9	16
2·1	1·3	0·9	.....	.....	.....	.....	.....	10·3	1·5	.....	.....	.....	.....	31·7	0	.....	5·0	4·6	30·6	4·19	11·5 (8·2)	.....	1·7	17
RIVER AT ROCKLAND, ONT.																								
1·9	2·3	1·1	.....	0·32	0·13	.....	.....	10·7	0	0·90	.....	.....	.....	25·9 (24·4)	0	4·0	4·8	6·6	27·8	4·21	18·7 (14·6)	.....	2·1	18

* Alkalis calculated as Na.

93295—3

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 12: OTTAWA RIVER AT CANADIAN INTERNATIONAL																		
1	Dec. 19/46	1294	18	.....	.....	32·1	.....	.....	7·6	55	9·5	.....	.....	.....	92·5	0·126	.....	.....	14·1
2	Jan. 17/47	1321	18	.....	.....	32·4	.....	(3·0)	7·4	55	2·5	.....	.....	.....	56·5	0·077	.....	.....	9·3
3	Feb. 13	1370	5	.....	.....	32·6	.....	(3·9)	7·1	50	1·8	.....	.....	.....	57·5	0·078	.....	.....	8·2
4	Mar. 21	1400	9	.....	.....	32·4	.....	.....	7·1	40	3·5	.....	.....	.....	60·5	0·082	.....	.....	7·9
5	April 18	1428	7	.....	.....	35·2	.....	.....	7·3	45	15·0	.....	.....	.....	76·5	0·104	.....	.....	11·4
6	May 23	1483	1	.....	.....	49·1	.....	.....	7·1	55	4·8	.....	.....	.....	47·4	0·064	.....	.....	6·1
7	Nov. 21	1730	5	.....	.....	40·1	.....	(1·2)	6·8	50	4·7	.....	.....	76·34	68·8	0·094	.....	24·6	9·4
8	Dec. 19	1771	14	.....	.....	32·0	.....	.....	7·2	60	4·4	.....	.....	58·41	55·2	0·075	.....	21·8	8·5
9	Average (8 samples)		10·0	.....	.....	35·7	.....	.....	7·2	51	5·8	.....	.....	.....	64·4	0·088	.....	.....	9·4
	STATION No. 13: OTTAWA																		
10	May 9/47	1448	2	157,568	148,125	42·8	.....	.....	7·4	45	4·3	.....	.....	.....	72·5	0·099	30,886	.....	7·9
11	June 2	1492	1	155,755	156,180	50·0	.....	.....	7·3	50	4·8	.....	.....	.....	61·4	0·0835	25,751	.....	8·0
12	July 2	1567	7	118,015	63,305	63·0	.....	.....	7·0	50	6·4	.....	.....	.....	58·2	0·079	18,460	23·4	8·2
13	Aug. 1	1611	18	46,808	29,240	70·0	.....	.....	7·1	55	6·4	.....	.....	.....	65·6	0·089	8,249	25·8	9·1
14	Sept. 1	1651	28	16,074	21,325	73·0	.....	.....	7·7	45	2·0	.....	.....	57·53	60·4	0·082	2,610	24·6	8·0
15	Oct. 1	1690	29	23,958	20,892	55·0	.....	.....	7·7	55	5·6	.....	.....	74·03	62·0	0·084	3,985	24·6	9·2
16	Nov. 7	1710	8	21,041	19,008	50·4	.....	.....	7·5	65	5·1	.....	.....	67·43	62·4	0·085	3,541	22·6	8·0
17	Dec. 5	1764	28	23,856	21,447	32·8	.....	.....	7·1	50	4·0	.....	.....	66·33	61·4	0·0835	3,944	25·0	10·0
18	Jan. 9/48	.....	.....	27,766	20,051	32·4	.....	.....	7·1	45	12·0	.....	.....	63·80	Data supplied by Ottawa filtration plant				
19	Feb. 12	.....	.....	22,890	20,014	32·9	.....	.....	7·1	40	14·0	.....	.....	68·20					
20	Mar. 8	.....	.....	18,718	24,930	32·9	.....	.....	7·0	40	12·0	.....	.....	69·30					
21	April 6	.....	.....	47,895	66,281	33·8	.....	.....	7·1	40	24·0	.....	.....	92·40					
22	Average (8 samples)		15·1	70,384	59,940	54·7	.....	.....	7·3	52	4·8	.....	.....	66·33	63·0	0·086	11,985	24·3	8·55
	STATION No. 14: OTTAWA RIVER																		
23	Jan. 30/47	1337	10	32,458	29,235	34·7	.....	3·5	7·2	70	.....	.....	.....	Alkalinity—27 p.p.m. as $CaCO_3$					
	STATION No. 15: OTTAWA RIVER (LAC DES																		
24	Sept. 16/47	2032	268	18,040	19,690	70·9	(7·0)	(2·0)	7·5 (7·3)	38 (55)	..... (<7)	.....	.....	57·42	51·4	0·070	2,500	25·0	6·6

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
PAPER COMPANY'S INTAKE AT GATINEAU MILLS, QUE.																								
2·6	2·4	.....	0·25	.....	.....	0·13	14·4	0	3·4	.....	.....	.....	41·5	0	14·5	.....	11·9	45·9	5·42	10·2	.....	1·0	1
1·5	1·4	.....	0·05	.....	.....	0	8·2	0	3·5	.....	.....	.....	25·6	0	3·0	.....	8·4	29·4	6·20	9·4	.....	1·6	2
1·7	2·0	.....	0·05	.....	.....	0·001	6·2	1·4	4·4	.....	.....	.....	24·0	0	0·5	.....	7·8	27·5	4·82	13·7	.....	2·3	3
2·2	3·2	.....	0·08	.....	.....	0	11·1	0	4·0	.....	.....	.....	26·1	0	4·0	.....	7·4	28·8	3·59	19·4	.....	1·9	4
4·8	3·3*	.....	0·07	.....	.....	0	9·1	0	3·5	.....	.....	.....	34·2	0	9·5	9·0	20·2	48·2	2·38	13·0	.....	1·4	5
1·8	4·7	.....	0·04	.....	.....	0	6·6	0	3·1	.....	.....	.....	18·8	0	8·6	4·9	7·2	22·6	3·39	31·1	.....	2·2	6
2·4	5·7	.....	0·39	.....	.....	0·006	13·5	0	0·44	.....	.....	.....	33·9	0	6·0	4·2	5·5	33·3	3·92	27·1	.....	2·1	7
2·4	4·4	.....	0·26	.....	.....	0	11·4	0	1·3	.....	.....	.....	24·4	0	5·4	4·4	11·1	31·1	3·54	23·6	.....	1·9	8
2·4	3·4	.....	0·149	.....	.....	0·02	10·1	.....	4·4	.....	.....	.....	28·4	0	6·4	.....	10·0	33·35	3·92	18·1	.....	1·8	9
RIVER AT OTTAWA, ONT.																								
3·1	8·3	.....	0·09	.....	.....	0	17·3	0	1·8	.....	.....	.....	26·8	0	7 0	5·8	10·5	32·5	2·55	35·7	.....	1·7	10
2·5	3·0	.....	0·002	.....	.....	0	9·1	0	3·1	.....	.....	.....	26·1	0	6·8	4·6	8·9	30·3	3·20	17·8	.....	1·8	11
2·4	3·1	.....	0·41	.....	.....	0	8·4	0	1·3	.....	.....	.....	24·2	0	7·4	2·7	10·5	30·3	3·42	18·2	.....	2·0	12
3·0	2·9	.....	0·22	.....	.....	0	8·4	0	4·9	.....	.....	.....	30·3	0	4·4	1·8	10·3	35·1	3·03	15·3	.....	1·7	13
2·4	4·1	.....	0·28	.....	.....	0	9·2	0	1·6	.....	.....	.....	31·5	0	7·4	5·4	4·0	29·8	3·33	23·0	.....	1·3	14
3·1	3·6	.....	0·27	.....	.....	0	9·7	0	0·62	.....	.....	.....	31·0	0	6·4	5·8	10·3	35·7	2·97	18·0	.....	1·3	15
3·5	2·9	.....	0·37	.....	.....	0	11·9	0	0·75	.....	.....	.....	29·3	0	6·2	4·6	6·4	30·4	2·28	15·7	.....	1·5	16
3·2	3·9	.....	0·30	.....	.....	0	12·8	0	1·3	.....	.....	.....	27·3	0	6·8	4·8	15·7	38·1	3·12	18·2	.....	1·9	17
																							18
																							19
																							20
																							21
2·9	4·0	.....	0·24	.....	.....	0	10·9	0	1·9	.....	.....	.....	28·3	0	6·6	4·4	9·6	32·8	2·98	20·7	.....	2·1	22
AT INTAKE PUMP, HULL, QUE.																								
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32·9	0	.....	.....	.....	.....	.....	.....	.....	.....	23
GERATS) ABOVE MOUTH OF BONNECHÈRE RIVER																								
1·9	2·4*	.....	0·10	.....	.....	.....	9·2	0·5	0·9	.....	.....	.....	22·7 (22·0)	0 (0)	.....	6·4 (4·0)	5·7	24·3	3·47	17·5	.....	1·8	24

* Alkalis calculated as Na.

93295—3½

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 16: OTTAWA RIVER																		
1	Aug. 5/47.....	2056	317	.....	.....	66·7	.....	(5·0)	7·3 (7·0)	38 (40)	Rel. clear	.....	.....	54·34	45·6	0·062	.....	18·6	6·8
	STATION No. 17: OTTAWA RIVER																		
2	Aug. 6/47.....	1622	19	29,960	28,670	70·5	.....	(7·5)	6·4 (6·6)	45 (40)	3·1	.....	.....	.....	51·8	0·070	4152·5	24·8	5·8
	STATION No. 18: OTTAWA RIVER AT INTAKE TO																		
3	Aug. 7/47.....	2087	324	.....	.....	73·0	.....	(8·0)	7·3 (6·6)	49 (45)	Rel. clear	.....	.....	57·42	57·4	0·078	.....	18·0	6·8
	STATION No. 19: OTTAWA RIVER AT RAILWAY																		
4	Aug. 8/47.....	2041	308	.....	.....	67·1	.....	(9·0)	6·9	45	<7	.....	.....	55·33	52·6	0·072	.....	21·2	6·0
	STATION No. 20: OTTAWA RIVER AT WEST DAM																		
5	May 10/47.....	1454	4	20,070	31,320	.....	.....	.....	7·3	40	3·6	.....	.....	.....	60·5	0·082	3258·6	.....	7·1
6	June 9.....	1501	7	27,350	31,740	.....	.....	.....	7·0	45	6·4	.....	.....	.....	59·4	0·081	4386·4	.....	7·2
7	July 10.....	1571	5	18,520	17,790	.....	.....	.....	7·1	55	5·6	.....	.....	.....	54·8	0·075	2750·2	22·8	6·9
8	Aug. 11.....	1630	18	17,000	16,220	.....	.....	.....	6·6	40	6·7	.....	.....	.....	49·2	0·067	2255·2	18·2	5·6
9	" 12**.....	2044	304	15,960	16,220	69·4	.....	(3·0)	6·8	40	<7	.....	.....	63·47	45·2	0·061	1927·6	16·6	5·2
10	Sept. 15.....	1666	21	15,880	16,170	.....	.....	.....	7·4	55	4·4	.....	.....	51·26	50·2	0·068	2138·1	18·6	6·8
11	Oct. 10.....	1697	25	13,000	13,700	.....	.....	.....	7·4	65	2·6	.....	.....	52·03	51·2	0·070	1808·1	22·4	6·0
12	Nov. 12.....	1738	18	13,000	13,800	.....	.....	.....	7·2	60	5·5	.....	.....	54·56	50·4	0·069	1776·1	20·2	6·5
13	Dec. 12.....	1786	41	19,100	15,900	.....	.....	.....	7·0	40	2·2	.....	.....	62·26	55·8	0·076	2874·2	21·6	6·8
14	Jan. 9/48.....	1804	27	14,800	15,300	.....	.....	.....	7·2	50	5·4	.....	.....	61·27	54·8	0·075	2197·8	20·0	7·6
15	Feb. 11.....	1826	12	14,900	15,300	.....	.....	.....	7·4	45	7·4	.....	.....	61·05	60·2	0·082	2419·2	24·2	7·3
16	Mar. 11.....	1867	7	11,000	11,500	.....	.....	.....	7·1	60	5·8	.....	.....	55·77	53·2	0·072	1568·2	21·2	6·7
17	April 15.....	1943	12	26,500	27,000	.....	.....	.....	7·3	50	4·5	.....	.....	57·64	54·0	0·073	3830·3	31·0	6·0
18	Jan. 24/49**...	2722	10	16,000	16,300	.....	.....	.....	7·5	38	3·0	.....	.....	63·91	56·4	0·077	2439·4	24·0	7·2
19	Average (12 samples).....		16·4	17,593	18,812	.....	.....	.....	7·2	50·4	5·0	.....	.....	56·98	54·5	0·074	2605·2	22·0	6·8

** Not included in average.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
AT CAMPBELL'S BAY, QUE.																								
2·5	1·3*	.....	0·06	.....	.....	0	9·4	0	2·6	.....	.....	.....	22·0 (19·5)	0 (0)	.....	9·0	9·3	27·3	2·72	9·0	.....	1·8		1
AT PEMBROKE WATER WORKS, PEMBROKE, ONT.																								
2·5	2·0*	.....	0·27	.....	.....	.....	8·9	0·9	2·7	.....	.....	.....	15·6 (17·1)	0 (0)	4·8	2·6	12·0	24·8	2·32	20·3	.....	3·1		2
WATER WORKS, DEEP RIVER, ONT.																								
2·1	2·1*	.....	0·04	.....	.....	.....	9·5	2·0	2·2	.....	.....	.....	19·5 (17·1)	0 (0)	.....	6·4	9·6	25·6	3·24	15·8	.....	2·0		3
BRIDGE ABOVE MOUTH OF MATTAWA RIVER																								
2·8	4·8*	.....	0·11	.....	.....	.....	11·6	0	4·2	.....	.....	.....	26·8 (26·8)	0 (0)	.....	6·8	4·5	26·5	2·14	28·2	.....	2·3		4
AT TIMISKAMING, QUE.—Drainage area, 17,750 square miles																								
4·8	4·3		.....	0·23	.....	.....	0	16·1	0	3·1	.....	.....	.....	21·5	0	2·5	5·0	19·9	37·5	1·48	20·0	.....	2·1		5
2·7	1·2		.....	0·08	.....	.....	0	7·9	0	1·8	.....	.....	.....	25·6	0	7·4	4·8	8·1	29·1	2·66	8·2	.....	2·2		6
2·8	0·9		.....	0·43	.....	.....	0	7·9	0	2·7	.....	.....	.....	25·6	0	7·2	3·9	7·7	28·7	2·46	6·2	.....	2·1		7
2·7	1·7		.....	0·001	.....	.....	0	8·6	0	4·0	.....	.....	.....	18·5	0	5·0	4·6	9·9	25·1	2·07	12·9	.....	2·8		8
2·8	2·2*		.....	0·06	.....	.....	.....	11·2	0·7	0·8	.....	.....	.....	19·5	0	.....	4·0	8·5	24·5	1·86	16·0	.....	2·6		9
2·1	3·6		.....	0·13	.....	.....	0	7·9	0	0·88	.....	.....	.....	21·5	0	4·0	4·4	8·0	25·6	3·23	23·4	.....	1·9		10
1·6	4·3		.....	0·15	.....	.....	0	8·9	0	0·71	.....	.....	.....	21·2	0	4·4	4·0	4·2	21·6	3·75	30·1	.....	1·9		11
2·5	2·5		.....	0·22	.....	.....	0	7·9	0	0·89	.....	.....	.....	26·6	0	3·4	4·6	4·7	26·5	2·60	17·0	.....	2·0		12
2·7	4·4		.....	0·16	.....	.....	0	9·7	0	2·0	.....	.....	.....	24·9	0	4·6	4·0	7·7	28·1	2·52	25·4	.....	2·2		13
3·4	2·6		.....	0·30	.....	.....	0	9·9	0	1·3	.....	.....	.....	31·2	0	6·6	3·6	7·3	32·9	2·23	14·7	.....	1·9		14
2·4	2·5	1·0	.....	0·39	.....	.....	0	10·0	0	0·75	.....	.....	.....	27·6	0	9·6	4·6	5·5	28·1	3·04	19·4 (15·6)	.....	1·7		15
2·4	2·0	0·5	.....	0·30	.....	.....	0	9·1	0	0·84	.....	.....	.....	26·4	0	7·0	2·4	4·9	26·5	2·79	15·8 (13·8)	.....	2·1		16
2·1	1·0	1·0	.....	0·28	.....	.....	0	8·4	0	0·97	.....	.....	.....	21·2	0	6·2	6·6	7·5	24·9	3·14	12·2 (7·7)	.....	1·9		17
2·9	1·1	1·2	.....	0·32	.....	.....	.....	12·3	0	0·62	.....	.....	.....	24·4	0	7·0	2·6	9·9	29·9	2·48	11·6 (7·1)	.....	1·7		18
2·7	2·7		.....	0·22	.....	.....	0	9·36	0	1·7	.....	.....	.....	24·3	0	5·7	4·4	7·9	27·9	2·52	17·2	.....	2·0		19

* Alkalis calculated as Na.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 21: OTTAWA RIVER (LAKE TIMISKAMING) AT																		
1	Aug. 29/47.....	2045	287	14,900 (at Timiskaming)	16,220	69·8	.....	(7·0)	7·0 (6·8)	65 (110)	(15·0)	.....	.....	61·16	55·0	0·0748	2206·6	20·8	6·4
	STATION No. 22: OTTAWA RIVER (QUINZE RIVER) AT POWER																		
2	May 12/47.....	1465	8	37,510	46,000	34·0	.....	.....	6·4	50	5·1	.....	.....	.....	41·8	0·0569	4,226·0	.....	4·0
3	June 12.....	1506	7	67,400	61,170	50·0	.....	.....	6·1	65	6·3	.....	.....	.....	53·0	0·0722	9,635·2	34·0	3·2
4	July 13.....	1598	23	13,910	19,630	70·0	.....	.....	6·2	65	3·7	.....	.....	.....	44·0	0·0599	1,649·8	20·8	3·1
5	Aug. 11.....	1631	18	12,640	10,830	70·0	.....	.....	6·5	60	3·6	.....	.....	.....	45·0	0·0612	1,513·7	17·6	3·4
6	Sept. 12.....	1662	24	7,590	7,650	71·6	.....	.....	6·7	60	3·2	.....	.....	36·85	48·0	0·0653	981·3	18·0	4·0
7	Oct. 11.....	1698	24	7,910	7,680	53·1	.....	.....	7·2	65	5·1	.....	.....	33·33	48·4	0·0658	1,030·5	19·6	4·0
8	Nov. 14.....	1740	16	9,040	7,460	41·0	.....	.....	6·6	80	6·0	.....	.....	35·31	45·8	0·0622	1,224·2	18·6	3·7
9	Dec. 11.....	1784	42	6,820	7,820	33·0	.....	.....	6·8	45	5·0	.....	.....	33·11	42·6	0·058	783·2	17·8	3·6
10	Jan.—No sample taken.																		
11	Feb. 14/48.....	1834	13	6,740	6,640	40·1	.....	.....	6·5	45	5·1	.....	.....	32·67	39·6	0·0539	719·3	18·6	3·6
12	Mar. 14.....	1882	9	5,770	5,670	32·0	.....	.....	6·7	55	5·1	.....	.....	34·21	45·4	0·0618	706·0	19·8	3·2
13	April 13.....	1938	14	10,200	14,200	.....	.....	.....	6·5	50	5·0	.....	.....	35·64	40·0	0·0544	1,098·7	19·4	2·6
14	" 22.....	1961	19	20,400		.....	.....	.....	6·7	50	5·0	.....	.....	38·72	44·8	0·061	2,463·9	23·8	3·6
15	Average (12 samples).....		18·1	17,236	17,412	49·5	.....	.....	6·6	57·5	4·9	.....	.....	34·98	44·9	0·061	2,169·3	20·7	3·5
	STATION No. 23: LAC DES QUINZE																		
16	Aug. 13/47.....	2034	302	12,370	10,830	71·6	(7·7)	(3·0)	6·9	45	10·0	.....	.....	32·34	34·6	0·047	1,151·2	19·0	2·5
	STATION No. 24: L'ASSOMPTION RIVER																		
17	June 25/47.....	2030	345	1,430	1,790	67·1	(7·4)	(2·3)	7·0 (7·2)	48 (60)	(21·0)	.....	.....	57·42	48·4	0·0658	186 3	15·8	7·2
	STATION No. 25: L'ASSOMPTION RIVER AT INTAKE																		
18	June 25/47.....	2055	356	1,430	1,790	68·9	(7·6)	(2·5)	8·9 (7·2)	45 (35)	(<7)	.....	.....	45·21	40·2	0·0547	154·9	13·6	4·9

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
INTAKE HAILEYBURY WATER WORKS, HAILEYBURY, ONT.																								
3·0	4·5*		.....	0·24	.....	.....	.....	10·5	1·7	3·5	.....	.....	.....	26·8 (19·5)	0 (0)	.....	5·8	6·3	28·3	2·13	25·6	.....	2·2	1
PLANT BELOW ANGLIERS, QUE.—Drainage Area, 8,900 square miles																								
2·4	2·3		.....	0·02	.....	.....	.....	8·4	0	2·2	.....	.....	.....	10·2	0	5·6	5·9	11·5	19·9	1·67	20·1	.....	3·4	2
1·1	3·3		.....	0·08	.....	.....	.....	6·3	0	4·0	.....	.....	.....	9·0	0	6·2	4·5	5·1	12·5	2·91	36·4	.....	3·9	3
1·8	2 1		.....	0·18	.....	.....	0·03	9·1	0	1·7	.....	.....	.....	9·5	0	5·2	2·2	7·4	15·2	1·72	23·2	.....	3·7	4
1·8	2·3		.....	0·34	.....	.....	0·04	7·4	0	3·5	.....	.....	.....	10·0	0	6·0	3·6	7·7	15·9	1·89	24·0	.....	3·4	5
1·5	3·1		.....	0·47	.....	.....	0·06	7·1	0	0·80	.....	.....	.....	14·4	0	5·2	4·1	4·4	16·2	2·67	29·5	.....	3·0	6
1·1	3·9		.....	0·74	.....	.....	0	7·1	0	0·62	.....	.....	.....	11·2	0	4·2	3·4	5·3	14·5	3·64	36·7	.....	2·6	7
1·3	3·4		.....	0·54	.....	.....	0	8·2	0	0·80	.....	.....	.....	16·8	0	6·0	3·2	0·8	14·6	2·85	33·7	.....	3·0	8
2·0	1·7*		.....	0·43	.....	.....	0	9·7	0	1·1	.....	.....	.....	15·9	0	3·4	3·4	4·2	17·2	1·80	17·7	.....	2·9	9
																								10
1·8	1·5	0·5	.....	0 35	.....	.....	0·07	7·7	0	0·75	.....	.....	.....	15·1	0	4·0	3·0	4·0	16·4	2·00	19·2 (16·1)	.....	3·2	11
1·5	1·5	0 5	.....	0·30	.....	.....	0·05	7·7	0	0·35	.....	.....	.....	12·2	0	4·4	5·4	4·2	14·2	2·13	21·6 (18·1)	.....	3·3	12
1·0	1·0	2·0	.....	0·10	.....	.....	0	6·3	0	0·88	.....	.....	.....	8·1	0	1·4	6·2	4·0	10·6	2·63	30·9 (14·1)	.....	3·6	13
1·3	2·0	1·5	.....	0·37	.....	.....	0·06	8·2	0	1·8	.....	.....	.....	8·1	0	4·0	4·6	7·7	14·3	2·77	30·4 (21·1)	.....	3·2	14
1·6	2·6*		.....	0·33	.....	.....	.....	7·8	0	1·5	.....	.....	.....	11·7	0	4·6	4·1	5·5	15·1	2·19	26·9	.....	3·3	15
AT DAM AT ANGLIERS, QUE.																								
0·9	3·9*		.....	0·17	.....	.....	.....	7·5	0	3·1	.....	.....	.....	9·8	0	.....	5·8	2·0	10·0	2·78	45·8	.....	3·1	16
AT L'ASSOMPTION, QUE. (traffic bridge)																								
2·3	3·2*		.....	0·05	.....	.....	.....	4·8	1·0	2·6	.....	.....	.....	23·2 (23·2)	0 (0)	.....	10·4	8·4	27·4	3·13	23·5	.....	1·5	17
TO JOLIETTE WATER WORKS, JOLIETTE, QUE.																								
1·0	3·9*		.....	0·07	.....	.....	.....	6·4	0	2·2	.....	.....	.....	(12·4)	(0)	.....	9·4	8·4	16·4	4·90	19·8	.....	0·83	18

* Alkalis calculated as Na.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 26: L'ASSOMPTION RIVER																		
1	May 27/47	1491	3	4,150	4,590	.....	.....	.....	6·6	45	1·9	.....	.....	.....	36·2	0·049	402·6	.....	3·7
2	June 27	1565	5	1,520	1,790	.....	.....	.....	6·7	50	15·5	.....	.....	.....	74·2	0·101	304·0	16·6	4·2
3	July 29	1608	13	1,540	819	.....	.....	.....	6·6	60	6·4	.....	.....	.....	71·6	0·0974	297·0	23·2	6·0
4	Aug. 28	1645	18	269	477	.....	.....	.....	6·3	30	3·2	.....	.....	.....	53·0	0·0722	38·47	20·6	6·2
5	Sept. 1	1655	28	412	449	.....	.....	.....	6·4	50	6·0	.....	.....	53·02	53·0	0·0722	58·89	22·2	5·5
6	Oct. 27	1721	25	321	396	.....	.....	.....	6·4	50	6·7	.....	.....	66·00	53·2	0·0724	46·02	16·8	6·0
7	Nov. 27	1775	51	360	391	.....	.....	.....	6·8	35	4·4	.....	.....	57·53	51·0	0·0694	49·47	16·0	5·6
8	Dec. 29	1797	38	288	315	.....	.....	.....	6·5	35	8·1	.....	.....	63·47	55·6	0·0756	43·11	17·2	5·6
9	Jan. 29/48	1815	19	137	181	.....	.....	.....	6·4	35	6·0	.....	.....	72·82	61·0	0·083	22·51	20·2	7·8
10	Feb. 26	1845	8	151	135	.....	.....	.....	6·5	60	9·0	.....	.....	97·35	66·0	0·0898	26·85	19·6	7·0
11	Mar. 30	1931	22	1,060	459	.....	.....	.....	6·6	30	4·0	.....	.....	46·64	62·4	0·0849	178·2	21·0	8·5
12	April 27	1962	14	2,260	2,280	.....	.....	.....	6·5	40	5·0	.....	.....	34·65	42·6	0·058	295·5	24·6	3·6
13	Average (12 samples)		20·3	1,039	1,024	.....	.....	.....	6·5	43·3	6·4	.....	.....	61·43	56·6	0·077	146·9	19·7	5·8
	STATION No. 27: OUAREAU RIVER AT TRAFFIC																		
14	June 29/47	2029	341	1,280	2,087	75·0	8·1	2·0	7·4	38	.....	.....	.....	32·45	30·8	0·0419	106·2	11·8	3·2
	STATION No. 28: OUAREAU RIVER AT TRAFFIC																		
15	May 13/47	1466	7	6,300	5,362	.....	.....	.....	6·6	35	1·3	.....	.....	.....	29·8	0·0405	505·2	.....	2·9
16	" 27	1490	3	5,250	5,362	.....	.....	.....	6·6	40	0·7	.....	.....	.....	31·2	0·0425	441·8	.....	3·8
17	July 10**	1593	19	791	998	.....	.....	.....	6·6	45	1·5	.....	.....	.....	43·8	0·0596	93·3	21·2	3·6
18	" 17	1599	19	791	998	.....	.....	.....	6·2	65	0·8	.....	.....	.....	43·8	0·0596	93·3	21·6	3·8
19	Aug. 27	1672	49	233	440	.....	.....	.....	7·5	25	2·5	.....	.....	34·76	39·4	0·0536	24·7	16·6	4·0
20	Sept. 1**	1656	28	282	449	.....	.....	.....	7·2	32	3·0	.....	.....	37·73	37·2	0·0506	28·2	14·6	4·5
21	" 20	1687	31	645	449	.....	.....	.....	6·8	60	4·5	.....	.....	38·61	43·0	0·0585	14·7	20·2	3·8
22	Oct. 27	1720	25	297	492	.....	.....	.....	6·8	35	6·2	.....	.....	31·13	34·2	0·0465	27·3	12·4	2·6
23	Average (6 samples)		22	2,253	2,175	.....	.....	.....	6·75	43·6	2·7	.....	.....	.....	36·9	0·0502	184·5	17·7	3·5

** Not included in average.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
ABOVE JOLIETTE, QUE.—Drainage Area, 460 square miles																								
1·1	3·1		.....	0	.....	.....	0	5·4	0	1·0	.....	.....	.....	10·0	0	6·2	5·0	5·6	13·8	3·36	32·7	.....	3·2	1
2·4	3·1		.....	1·82	.....	.....	0·14	7·2	0	1·7	.....	.....	.....	17·1	0	20·6	4·6	6·3	20·3	1·75	24·9	.....	2·9	2
2·5	3·5		.....	0·75	.....	.....	0	5·8	0	3·1	.....	.....	.....	22·7	0	14·4	2·0	6·7	25·3	2·40	23·2	.....	2·7	3
1·8	3·9		.....	0·39	.....	.....	0·4	8·7	0	1·2	.....	.....	.....	21·7	0	6·0	5·9	4·9	22·7	3·44	27·1	.....	3·0	4
1·9	5·7		.....	0·37	.....	.....	0	8·2	0	1·8	.....	.....	.....	17·6	0	6·4	5·6	7·2	21·6	2·89	36·6	.....	3·0	5
1·9	5·1		.....	0·27	.....	.....	0	7·4	2·6	1·8	.....	.....	.....	24·4	0	5·6	6·6	2·8	22·8	3·16	32·8	.....	2·9	6
2·3	3·5		.....	0·32	.....	.....	0	10·2	0	1·8	.....	.....	.....	21·0	0	7·6	6·2	6·2	23·4	2·43	24·6	.....	2·6	7
3·0	5·6		.....	0·18	.....	.....	0	16·6	1·9	1·8	.....	.....	.....	24·6	0	9·4	7·1	6·1	26·3	1·90	31·5	.....	2·8	8
3·0	4·0	1·5	.....	0·32	.....	.....	0·83	11·4	0·6	1·8	.....	.....	.....	29·3	0	9·6	8·8	7·8	31·8	2·60	25·0 (20·5)	.....	2·7	9
2·5	6·5	1·5	.....	0·10	.....	.....	0·07	10·2	5·9	0·89	.....	.....	.....	32·2	0	10·8	8·2	1·4	27·8	2·80	36·6 (32·3)	.....	2·6	10
1·5	2·0	1·0	.....	0·64	.....	.....	0	7·4	3·0	1·8	.....	.....	.....	16·6	0	12·2	5·6	13·9	27·5	5·67	17·1 (13·2)	.....	2·7	11
1·3	1·5	1·0	.....	0·31	.....	.....	0	6·1	0	1·8	.....	.....	.....	6·8	0	5·6	5·2	8·7	14·3	2·76	24·0 (17·3)	.....	3·5	12
2·1	4·2		.....	0·46	.....	.....	0·012	8·7	0·12	1·75	.....	.....	.....	20·3	0	9·5	5·9	6·4	23·1	2·76	28·3	.....	2·9	13
BRIDGE BETWEEN ST. JACQUES AND JOLIETTE, QUE.																								
1·8	4·0*		.....	0·14	.....	.....	.....	5·0	1·0	0·9	.....	.....	.....	12·4	0	.....	7·4	5·2	15·4	1·68	39·7	.....	2·4	14
BRIDGE AT RAWDON, QUE.—Drainage area, 480 square miles																								
1·7	0·7		.....	0·01	.....	.....	0	5·3	0	2·2	.....	.....	.....	8·5	0	4·6	5·3	7·2	14·2	1·71	9·7	.....	3·4	15
1·1	2·6		.....	0·005	.....	.....	0	4·3	0	2·7	.....	.....	.....	9·8	0	4·8	5·2	6·0	14·0	3·45	28·5	.....	3·2	16
1·2	3·4		.....	0·12	.....	.....	0·30	5·1	0	2·7	.....	.....	.....	12·4	0	5·6	2·6	3·7	13·9	3·00	34·7	.....	3·15	17
1·9	1·4		.....	0·12	.....	.....	0	4·8	0	3·5	.....	.....	.....	13·4	0	5·8	2·4	6·3	17·3	2·00	15·0	.....	3·5	18
1·1	2·5		.....	0·30	.....	.....	0	5·6	0	2·2	.....	.....	.....	16·6	0	6·0	7·4	0·9	14·5	3·64	27·0	.....	2·1	19
0·7	4·9		.....	0·24	.....	.....	0	4·4	0	1·8	.....	.....	.....	14·2	0	5·4	7·2	2·6	14·2	6·43	43·0	.....	2·4	20
1·2	3·4		.....	0·22	.....	.....	0	5·0	1·0	1·8	.....	.....	.....	11·2	0	5·2	7·2	5·2	14·4	3·17	33·9	.....	3·0	21
1·1	2·7		.....	0·22	.....	.....	0	5·3	0	1·4	.....	.....	.....	12·2	0	6·2	6·2	3·5	13·5	2·36	34·6	.....	3·1	22
1·35	2·2		.....	0·15	.....	.....	.....	5·05	.....	2·3	.....	.....	.....	11·9	0	5·4	5·6	4·9	14·7	2·59	25·2	.....	3·2	23

* Alkalis calculated as Na.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
																			STATION No. 29: L'ACHIGAN RIVER
1	June 26/47.....	2078	362	.....	.....	69·4	(8·5)	(1·4)	7·7 (7·0)	30 (50)	(<7)	.....	.....	54·89	45·2	0·0615	.....	15·0	5·6
																			STATION No. 30: MASCOUCHE RIVER
2	June 24/47.....	2080	364	Slow	.....	73·8	6·4	5·0	9·4 (7·5)	80 (180)	(45·0)	.....	.....	172·37	127·2	0·173	.....	30·2	18·8
																			STATION No. 31: RIVIÈRE DU
3	June 27/47.....	2077	362	Slow	.....	70·2	(8·3)	(3·5)	8·3 (8·3)	35 (50)	(28·0)	.....	.....	439·89	263·8	0·359	.....	46·2	49·2
																			STATION No. 32: NORTH RIVER AT
4	July 4/47.....	2064	353	656 at St. Jérôme, Que.	1,060	71·6	(5·8)	(7·0)	7·7 (7·0)	38 (40)	(<7)	.....	.....	60·28	52·8	0·0718	93·3	20·8	7·5
																			STATION No. 33: NORTH RIVER AT
5	June 24/47.....	2024	346	929	1,421	68·9	(7·8)	(2·5)	8·1 (7·5)	38 (43)	(11·0)	.....	.....	45·76	38·5	0·0524	96·4	16·2	6·4
																			STATION No. 34: NORTH RIVER ABOVE
6	May 22/47.....	1486	1	3,410	3,715	.....	.....	.....	6·8	45	3·2	.....	.....	.....	39·2	0·0533	359·9	.....	4·2
7	June 27.....	1564	5	744	1,421	.....	.....	.....	7·1	40	1·8	.....	.....	.....	45·6	0·0620	91·3	16·0	5·8
8	July 24.....	1606	18	1,060	1,060	.....	.....	.....	6·7	55	2·7	.....	.....	.....	50·8	0·0642	134·7	22·0	6·0
9	Aug. 27.....	1646	19	312	419	.....	.....	.....	6·9	30	1·0	.....	.....	.....	46·6	0·0634	39·2	18·6	6·8
10	Sept. 23.....	1674	22	823	474	.....	.....	.....	7·0	55	0·6	.....	.....	50·60	36·4	0·0495	80·7	16·4	6·9
11	Oct. 24.....	1717	22	294	330	.....	.....	.....	7·4	35	5·6	.....	.....	55·22	50·8	0·0642	37·4	17·4	7·0
12	Nov. 18.....	1746	17	389	391	.....	.....	.....	7·1	40	3·0	.....	.....	53·13	49·8	0·0677	52·1	17·6	6·5
13	Dec. 15.....	1791	44	310	313	.....	.....	.....	7·1	35	4·5	.....	.....	53·90	50·4	0·0686	42·1	18·2	6·3
14	Jan. 1948.....	No sample taken																	
15	Feb. 17.....	1831	10	287	266	.....	.....	.....	6·9	30	8·1	.....	.....	64·79	65·4	0·089	50·6	22·8	7·3
16	Mar.....	No sample taken																	
17	April 15.....	1958	26	2,040	2,660	.....	.....	.....	6·7	35	1·6	.....	.....	38·28	38·4	0·0522	210·8	20·8	4·2
18	Average (10 samples).....		18·4	967	1,104	.....	.....	.....	7·0	40·4	3·2	.....	.....	52·65	47·3	0·0634	109·9	18·9	6·1

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
JUST BELOW NEW GLASGOW, QUE.																								
1·4	4·1*		.....	0·10	.....	.....	Tr	6·0	0	3·1	.....	.....	.....	24·4 (15·9)	0 (0)	.....	10·8 (6·0)	0	19·7	4·00	24·2	.....	1·6	1
AT TRAFFIC BRIDGE AT MOUTH																								
6·9	9·8*		.....	0·68	.....	.....	.....	11·8	3·5	4·4	.....	.....	.....	43·4 (73·2)	24·2 (0)	.....	1·0	0	75·3	2·73	22·1	1·2	(0·83)	2
CHÊNE AT ST. EUSTACHE, QUE																								
22·4	0·7*		.....	0·14	.....	.....	.....	28·6	12·4	1·7	.....	.....	.....	201·5 (184·0)	10·1 (0)	.....	6·5	32·8	214·8	2·20	0·7	0·86	.....	3
TRAFFIC BRIDGE AT LACHUTE, QUE.																								
2·2	2·7*		.....	0·18	.....	.....	.....	5·5	0	3·1	.....	.....	.....	31·7 (28·1)	0 (0)	.....	7·4	1·8	27·8	3·41	17·4	.....	1·4	4
TRAFFIC BRIDGE AT ST. JÉRÔME, QUE.																								
1·3	2·4*		.....	0·11	.....	.....	.....	4·8	0	1·7	.....	.....	.....	19·5 (17·1)	0 (0)	.....	5·0	5·3	21·3	4·02	19·7	.....	1·2	5
ST. JÉRÔME—Drainage area, 445 square miles																								
1·1	2·5		.....	0·001	.....	.....	0·03	5·1	0	3·5	.....	.....	.....	16·8	0	5·6	5·6	1·2	15·0	3·81	26·4	.....	2·8	6
1·9	3·0		.....	0·36	.....	.....	0	6·8	0	3·5	.....	.....	.....	22·0	0	7·0	5·7	4·3	22·3	3·05	22·6	.....	2·2	7
1·3	4·4		.....	0·22	.....	.....	0	4·8	0	3·1	.....	.....	.....	19·8	0	7·6	2·0	4·1	20·3	4·61	32·0	.....	2·7	8
1·5	2·7		.....	0·10	.....	.....	0	9·7	0	2·7	.....	.....	.....	24·2	0	5·8	7·0	3·4	23·2	4·53	20·2	.....	2·2	9
1·6	4·7		.....	0·34	.....	.....	0	7·2	0	0·88	.....	.....	.....	22·4	0	8·4	7·9	5·4	23·8	4·31	30·1	.....	2·2	10
2·6	3·4		.....	0·38	.....	.....	0	8·6	0	0·89	.....	.....	.....	24·9	0	6·4	7·6	7·8	28·2	2·69	20·8	.....	1·8	11
1·5	4·1		.....	0·18	.....	.....	0	9·6	0	1·3	.....	.....	.....	24·4	0	6·6	6·9	2·5	22·5	4·33	28·5	.....	2·1	12
2·0	4·0		.....	0·14	.....	.....	0	8·4	0	0·89	.....	.....	.....	32·0	0	11·4	8·6	0	21·1	3·15	37·5	.....	2·1	13
																								14
2·7	3·0	0·5	.....	0·54	.....	.....	0·8	7·4	0·7	1·8	.....	.....	.....	33·7	0	12·4	5·6	1·8	29·4	2·70	19·6 (17·9)	.....	2·1	15
																								16
1·3	1·0	1·0	.....	0·06	.....	.....	0	6·6	0	2·7	.....	.....	.....	10·5	0	4·2	5·8	7·2	15·8	3·23	18·1 (11·3)	.....	3·1	17
1·8	3·4		.....	0·23	.....	.....	.....	7·4	0	2·1	.....	.....	.....	23·1	0	7·5	6·3	3·7	22·6	3·39	24·6	.....	2·3	18

* Alkalis calculated as Na.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 35: NORTH RIVER (EAST BRANCH)																		
1	May 16/47.....	1474	4	824	903	42·1	.....	.....	6·6	40	0·5	.....	.....	.....	33·0	0·0449	73·25	.....	3·1
2	June 16.....	1510	3	448	300	52·0	.....	.....	6·5	115	4·9	.....	.....	.....	43·5	0·0592	52·5	27·5	3·2
3	July 16.....	1601	20	290	273	68·0	.....	.....	6·3	100	1·8	.....	.....	.....	51·0	0·0694	59·8	27·4	3·8
4	Aug. 13.....	1627	16	33	70	70·9	.....	.....	6·5	45	1·3	.....	.....	.....	46·0	0·0626	8·68	17·0	4·7
5	Sept. 16.....	1680	36	75	91	60·1	.....	.....	6·9	40	1·7	.....	.....	40·04	44·2	0·0601	8·92	18·0	5·6
6	Oct. 28.....	1722	24	65	72	46·8	.....	.....	6·8	45	1·4	.....	.....	40·48	41·2	0·0560	7·21	15·6	4·6
7	Average (6 samples).....		17·2	289	285	56·7	.....	.....	6·6	64	1·9	.....	.....	.....	43·1	0·0586	35·1	21·1	4·2
	STATION No. 36:																		
8	July 7/47.....	2072	351	.....	.....	64·4	(8·4)	(2·0)	7·3 (6·9)	38 (6·2)	(about 10)	.....	.....	36·30	40·4	0·0550	.....	15·0	4·4
	STATION No. 37: LAC DES SABLES																		
9	July 6/47.....	2058	346	.....	.....	66·6	(6·6)	(4·0)	6·8 (5·2)	25 (20)	.....	.....	.....	29·70	23·4	0·0318	.....	12·2	3·8
	STATION No. 38: WEST RIVER AT CANADIAN INDUSTRIES, LTD. INTAKE																		
10	May 23/47.....	1489	4	415	439	55·9	.....	.....	6·8	45	0·7	.....	.....	.....	38·2	0·052	42·7	.....	4·9
11	June 25.....	1562	7	106	171	68·9	.....	.....	7·0	40	1·6	.....	.....	.....	42·2	0·057	17·8	15·2	6·2
12	July 23.....	1604	19	98	112	68·9	.....	.....	6·7	60	0·6	.....	.....	.....	48·4	0·0658	12·8	22·4	6·4
13	Aug. 25.....	1647	21	25	51	75·9	.....	.....	6·9	25	0·8	.....	.....	.....	46·4	0·0631	3·12	25·6	8·7
14	Sept. 23.....	1675	22	60	35	57·2	.....	.....	7·2	45	0·5	.....	.....	57·53	51·2	0·0696	8·27	24·0	8·7
15	Oct. 22.....	1714	24	22	31	57·9	.....	.....	7·3	30	1·4	.....	.....	61·16	48·6	0·0661	2·88	15·4	8·6
16	Average (6 samples).....		16·2	121	140	64·1	.....	.....	7·0	40·8	0·9	.....	.....	.....	45·8	0·0622	14·6	20·5	7·3

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: ±	Saturation index: −	No.
NEAR MOUNT ROLLAND, QUE.—Drainage area, 85 square miles																									
1·1	1·6	.....	0·013	.....	.....	0	4·4	0	2·2	.....	.....	.....	9·5	0	4·6	5·7	4·4	12·2	2·82	21·9	.....	3·3			1
0·8	2·9	.....	0·033	.....	.....	0	4·3	0	2·2	.....	.....	.....	10·0	0	5·4	4·0	3·0	11·2	4·00	35·9	.....	3·4			2
2·2	0·9	.....	0·24	.....	.....	0	5·4	0	3·5	.....	.....	.....	12·7	0	4·6	2·3	8·1	18·5	1·73	9·55	.....	3·4			3
2·0	2·6	.....	0·29	.....	.....	0·02	4·3	0	4·0	.....	.....	.....	19·5	0	7·0	7·4	4·0	20·0	2·35	22·0	.....	3·0			4
1·6	3·5	.....	0·25	.....	.....	0	5·3	0	0·89	.....	.....	.....	19·3	0	7·8	8·8	4·8	20·6	3·50	27·1	.....	2·5			5
1·5	2·7	.....	0·13	.....	.....	0·14	5·8	0	1·2	.....	.....	.....	19·5	0	6·8	8·4	1·6	17·6	3·07	24·95	.....	2·7			6
1·5	2·4	.....	0·16	.....	.....	.....	4·9	0	2·3	.....	.....	.....	15·1	0	6·0	6·1	4·3	16·7	2·80	23·85	.....	3·0			7
MULET RIVER																									
1·4	2·0*	.....	0·14	.....	.....	.....	6·0	0	0·88	.....	.....	.....	17·1 (11·0)	0 (0)	.....	9·0	2·7	16·7	3·14	20·5	.....	2·2			8
AT STE. AGATHE DES MONTS, QUE.																									
0·9	1·3*	.....	0·002	.....	.....	.....	5·4	0	0·8	.....	.....	.....	7·3 (4·1)	0 (0)	.....	4·6	7·2	13·2	4·22	17·7	.....	3·2			9
AT BROWNSBURG, QUE.—Drainage area, 68 square miles																									
1·4	2·3	.....	0	.....	.....	0	6·3	0	2·7	.....	.....	.....	15·1	0	3·6	4·0	5·5	17·9	3·50	21·7	.....	2·8			10
1·8	2·1	.....	0·155	.....	.....	0	7·1	0	2·7	.....	.....	.....	21·5	0	6·2	3·8	5·3	22·9	3·44	16·6	.....	2·3			11
1·7	4·3	.....	0·07	.....	.....	0·02	5·6	0	2·2	.....	.....	.....	20·0	0	4·0	1·7	6·6	23·0	3·76	28·9	.....	2·6			12
1·5	2·2	.....	0·08	.....	.....	0	8·9	0	2·2	.....	.....	.....	27·8	0	4·2	4·4	5·1	27·9	5·80	14·6	.....	2·2			13
1·4	4·1	.....	0·09	.....	.....	0	8·2	0	0·88	.....	.....	.....	24·6	0	4·0	5·5	7·2	27·4	6·21	24·5	.....	1·9			14
2·8	1·6	.....	0·10	.....	.....	0	7·7	0	0·80	.....	.....	.....	27·6	0	3·4	4·8	10·4	33·0	3·07	9·6	.....	1·8			15
1·8	2·8	.....	0·08	.....	.....	0	7·5	0	1·9	.....	.....	.....	22·8	0	4·2	4·0	6·7	25·4	4·05	16·6	.....	2·2			16

* Alkalis calculated as Na.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids) P.P.M.	Residue on Evaporation (Dissolved solids) Tons per acre-foot	Residue on Evaporation (Dissolved solids) Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 39: ROUGE RIVER NEAR MOUTH																		
1	July 8/47.....	2047	339	3,930	3,520	66·6	(9·1)	(2·0)	6·7 (7·5)	45 (75)	(10)	.....	.....	43·67	42·6	0·058	451·3	14·8	5·6
2	June 9/49.....	3217	19	.....	.....	59·0	.....	1·6	7·1 (7·3)	30 (30)	2·7 (<5)	.....	.....	53·7	.....	.....	.....	.....	5·4
	STATION No. 40: ROUGE RIVER																		
3	May 14/47.....	1469	6	16,660	17,140	41·0	.....	.....	6·6	45	1·4	.....	.....	.....	40·6	0·0255	1,820·9	.....	4·3
4	June 15.....	1508	11	7,750	7,740	55·9	.....	.....	6·7	45	7·8	.....	.....	.....	75·4	0·1025	1,572·9	.....	4·6
5	July 13.....	1597	23	3,380	3,520	.....	.....	.....	6·8	37	3·4	.....	.....	.....	44·0	0·0598	400·2	17·2	5·1
6	Aug. 14.....	1632	15	2,010	2,240	78·1	.....	.....	6·9	33	1·1	.....	.....	.....	46·0	0·0626	249·1	14·8	5·8
7	Sept. 15.....	1678	37	1,790	2,210	68·0	.....	.....	7·0	35	7·7	.....	.....	50·71	49·4	0·0672	238·2	17·4	6·6
8	Oct. 16.....	1704	25	2,120	2,400	53·1	.....	.....	6·9	45	1·6	.....	.....	37·62	41·2	0·0561	235·5	15·8	5·3
9	Nov. 8**.....	1736	23	1,260	1,860	44·1	.....	.....	7·4	40	4·0	.....	.....	53·90	46·6	0·0634	158·2	14·2	6·9
10	" 15.....	1742	16	2,480	1,860	33·1	.....	.....	6·9	45	4·4	.....	.....	48·51	48·2	0·0656	322·1	19·0	5·8
11	Dec. 14.....	1787	39	1,080	1,590	32·5	.....	.....	7·1	35	2·0	.....	.....	47·63	47·6	0·0658	215·6	17·0	6·0
12	Jan. 1948.....	No sample taken.																	
13	Feb. 20/48.....	1837	7	656	628	32·5	.....	.....	7·0	30	1·8	.....	.....	54·01	45·4	0·0618	80·3	17·0	6·6
14	Mar. 12.....	1866	6	686	3,520	32·5	.....	.....	7·0	30	1·8	.....	.....	54·56	46·4	0·0632	85·8	15·4	6·9
15	April—No sample taken																		
16	May 7.....	2016	25	4,940	4,190	.....	.....	.....	7·5	32	0·7	.....	.....	30·16	39·0	0·0530	518·4	16·0	4·9
17	Average (11 samples).....		19·0	4,014	4,276	.....	.....	.....	6·9	37·5	3·0	.....	.....	47·46	47·6	0·0621	521·7	16·6	5·6
	STATION No. 41: ROUGE																		
18	July 5/47.....	2026	335	.....	.....	71·2	7·6	(2·0)	7·4 (7·3)	34 (50)	(<5)	.....	.....	41·47	35·6	0·0484	.....	14·2	4·8

** Sample not included in average.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
(HIGHWAY No. 8 BRIDGE)—Drainage area, 1,900 square miles																								
3·2	1·7*		.....	0·08	.....	.....	.....	6·5	0	2·6	.....	.....	.....	26·8 (14·6)	0 (0)	.....	7·9	5·1	27·1	1·75	12·0	.....	2·6	1
1·0	1·0	0·6	.....	.....	.....	.....	.....	7·8	1·7	.....	.....	.....	.....	19·5	0	.....	5·4	1·6	17·6	5·40	14·3 (10·6)	.....	2·3	2
AT BELL FALLS POWER PLANT																								
1·3	1·6*		.....	0·014	.....	.....	0	6·6	0	2·7	.....	.....	.....	9·5	0	7·0	5·6	8·3	16·1	3·31	17·8	.....	3·1	3
1·1	1·7		.....	0·17	.....	.....	0	6·3	0	3·5	.....	.....	.....	14·4	0	6·8	4·5	3·9	15·7	4·18	18·6	.....	2·9	4
2·6	0·6		.....	0·28	.....	.....	0	5·8	0	2·2	.....	.....	.....	17·6	0	5·8	2·6	9·1	23·5	1·96	5·3	.....	2·7	5
1·8	1·2		.....	0·26	.....	.....	0	5·9	0	4·0	.....	.....	.....	17·6	0	7·2	5·2	7·5	21·9	3·22	10·7	.....	2·5	6
1·7	3·9		.....	0·54	.....	.....	0	6·3	0	0·89	.....	.....	.....	22·0	0	10·4	6·2	5·5	23·5	3·88	26·6	.....	2·3	7
2·6	1·3		.....	0·27	.....	.....	0	8·9	0	0·53	.....	.....	.....	18·5	0	4·2	6·0	8·8	24·0	2·04	10·6	.....	2·5	8
1·5	4·4		.....	0·32	.....	.....	0·1	6·8	0	0·84	.....	.....	.....	24·6	0	7·6	7·6	3·3	23·5	4·60	29·0	.....	1·8	9
1·1	4·1		.....	0·23	.....	.....	0	7·7	0·7	1·3	.....	.....	.....	20·0	0	4·8	6·4	2·4	18·8	5·27	31·7	.....	2·5	10
1·5	5·4		.....	0·16	.....	.....	0	8·6	0	1·3	.....	.....	.....	21·7	0	5·0	5·8	3·4	21·2	4·00	35·7	.....	2·2	11
																								12
1·6	2·5	0·5	.....	0·16	.....	.....	0·08	8·2	0	1·1	.....	.....	.....	26·8	0	5·4	5·2	1·1	23·1	4·13	20·9 (18·7)	.....	2·2	13
1·7	1·5	0·5	.....	0·24	.....	.....	0	7·9	0	1·6	.....	.....	.....	27·2	0	7·0	4·4	2·0	24·3	4·06	13·8 (11·6)	.....	2·2	14
																								15
1·3	7·8		.....	0·08	.....	.....	0	5·4	0·8	2·2	.....	.....	.....	14·2	0	5·4	7·6	6·0	17·6	3·77	49·1	.....	2·1	16
1·66	2·9		.....	0·22	.....	.....	0	7·1	0	1·9	.....	.....	.....	19·0	0	6·3	5·4	5·3	20·9	3·37	15·2	.....	2·5	17
RIVER AT HUBERDEAU, QUE.																								
1·6	1·4		.....	0·14	.....	.....	.....	5·3	0·5	2·6	.....	.....	.....	16·1 (2·2)	0 (0)	.....	7·4	5·4	18·6	3·00	13·7	.....	2·1	18

* Alkalis calculated as Na.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 42: ROUGE RIVER JUST ABOVE MOUTH																		
1	May 21/47.....	1487	2	8,390	9,207	.....	.....	.....	6·4	40	0·9	.....	.....	.....	30·8	0·0419	696·1	.....	3·0
2	June 21.....	1531	2	5,410	4,325	.....	.....	.....	6·5	45	1·0	.....	.....	.....	34·2	0·0465	498·1	10·6	3·0
3	July 9**.....	2050	342	1,850	1,744	71·2	(0)	(3·0)	7·3 (7·4)	38 (65)	<7	.....	.....	40·15	44·8	0·0670	344·9	14·6	4·3
4	" 21.....	1610	21	1,550	1,744	.....	.....	.....	6·4	40	1·9	.....	.....	.....	40·6	0·0552	169·4	18·6	3·5
5	Aug. 21.....	1638	18	1,110	1,510	.....	.....	.....	6·5	35	1·2	.....	.....	.....	33·6	0·0457	100·4	18·0	3·9
6	Sept. 22.....	1673	23	1,750	1,537	.....	.....	.....	7·1	50	1·4	.....	.....	31·24	39·2	0·0583	202·0	20·6	4·2
7	Oct. 20.....	1708	21	1,650	1,770	.....	.....	.....	6·5	55	1·8	.....	.....	37·07	37·6	0·0562	183·6	16·4	4·2
8	Nov. 20.....	1727	6	866	893	.....	.....	.....	6·8	35	1·1	.....	.....	33·22	34·8	0·0473	81·1	14·4	3·8
9	Dec. 23.....	1795	36	575	841	.....	.....	.....	6·9	45	3·6	.....	.....	36·08	33·6	0·0457	52·0	13·4	4·0
10	Jan. 20/48.....	1812	22	340	372	.....	.....	.....	6·8	35	2·2	.....	.....	40·59	37·2	0·0506	34·1	13·4	4·4
11	Feb. 19.....	1836	8	330	331	.....	.....	.....	6·7	30	3·0	.....	.....	38·17	37·6	0·0508	33·2	15·4	3·9
12	Mar. 24.....	1930	28	1,450	708	.....	.....	.....	6·4	35	1·3	.....	.....	34·76	42·2	0·0574	164·8	19·8	8·6
13	April 20.....	1944	7	4,530	5,600	.....	.....	.....	6·4	35	1·5	.....	.....	30·36	33·2	0·0452	200·7	15·0	2·3
14	Average (12 samples).....		16·2	2,329	2,403	.....	.....	.....	6·6	40	1·7	.....	.....	35·19	36·2	0·0501	201·3	15·9	4·1
	STATION No 43: LAC NOMININGUE																		
15	July 25/47.....	2103	316	.....	.....	73·4	(7·7)	(1·7)	6·8 (7·3)	(37) (30)	(<7)	.....	.....	43·01	34·6	0·0471	.....	13·0	5·6
	STATION No 44: DIABLE																		
16	July 7/47.....	2083	355	.....	.....	64·4	(7·7)	(2·0)	7·6 (6·7)	31 (55)	.....	.....	.....	44·22	34·8	0·04735	.....	13·0	4·4
	STATION No 45: BRUCHET RIVER																		
17	June 21/47.....	2069	348	Fast	.....	74·8	(7·4)	(2·0)	7·7 (7·4)	16 (40)	(<7)	.....	.....	52·03	40·4	0·0550	.....	8·4	9·6

** Not included in average

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: I	Saturation index: −	No.
OF MACAZA RIVER—Drainage area, 948 square miles																									
1·1	2·3		.....	0	.....	.....	0	5·3	0	2·2	.....	.....	.....	7·8	0	3·2	4·4	5·6	12·0	2·73	29·1	.....	3·7		1
1·2	1·7		.....	0·225	.....	.....	0	6·3	0	1·8	.....	.....	.....	11·5	0	4·2	4·2	3·0	12·4	2·50	22·9	.....	3·4		2
0·6	3·8		.....	0·23	.....	.....	0	5·4	0	2·2	.....	.....	.....	17·1 (9·8)	0 (0)	.....	14·8	0	13·1	7·17	38·4	.....	2·3		3
1·1	2·6		.....	<0·01	.....	.....	0·10	5·3	0	1·6	.....	.....	.....	12·4	0	3·2	1·3	3·1	13·3	3·18	29·6	.....	3·4		4
1·3	2·5		.....	0·16	.....	.....	0	5·8	0	0·60	.....	.....	.....	12·9	0	4·0	2·6	4·5	15·1	3·00	26·5	.....	3·2		5
1·1	1·8		.....	0·22	.....	.....	0	6·9	0	0·62	.....	.....	.....	12·2	0	2·6	5·4	5·0	15·0	3·82	20·5	.....	2·6		6
2·4	1·7		.....	0·10	.....	.....	0·45	8·1	0	0	.....	.....	.....	12·7	0	3·0	4·6	9·9	20·3	1·75	15·3	.....	3·2		7
1·7	3·1		.....	0·14	.....	.....	0	9·1	0	0·89	.....	.....	.....	12·2	0	3·8	6·2	6·5	16·5	2·71	29·1	.....	3·0		8
1·8	3·3		.....	0·13	.....	.....	0	7·2	0	1·3	.....	.....	.....	15·9	0	5·8	6·2	4·4	17·4	2·22	29·2	.....	2·7		9
1·0	5·2		.....	0·18	.....	.....	0·28	8·7	0	1·1	.....	.....	.....	17·1	0	6·2	5·8	1·1	15·1	4·40	42·9	.....	2·8		10
1·1	2·5	0·5	.....	0·12	.....	.....	0·07	7·2	0	1·3	.....	.....	.....	20·1	0	3·8	4·8	0	14·3	3·55	29·9 (26·5)	.....	2·8		11
1·0	1·5	1·0	.....	0·06	.....	.....	0·06	7·1	5·2	2·6	.....	.....	.....	10·2	0	4·4	4·0	17·2	25·6	8·60	15·1 (10·8)	.....	3·1		12
0·6	0·5	0·5	.....	0·07	.....	.....	0	6·6	0	2·6	.....	.....	.....	5·9	0	1·8	6·8	3·4	8·2	3·83	17·6 (11·0)	.....	3·9		13
1·3	2·5		.....	0·12	.....	.....	0·08	7·0	0	1·4	.....	.....	.....	12·6	0	3·8	4·7	5·3	15·4	3·16	25·9	.....	3·1		14
AT BELLERIVE STATION, QUE.																									
1·0	2·4		.....	0·01	.....	.....	.....	3·6	0	0	.....	.....	.....	18·3 (14·6)	0 (0)	.....	5·5	3·1	18·1	5·60	22·5	.....	2·6		15
RIVER AT ST. JOVITE, QUE.																									
1·4	1·2		.....	0·21	.....	.....	.....	5·7	0	1·7	.....	.....	.....	14·6 (12·2)	0 (0)	.....	7·5	4·7	16·7	3·14	13·3	.....	2·0		16
NEAR ST. RÉMI D'AMHERST, QUE.																									
1·7	0·2		.....	0·09	.....	.....	.....	6·7	0	2·6	.....	.....	.....	22·0 (19·5)	0 (0)	.....	5·2	13·0	31·0	5·65	1·6	.....	1·4		17

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TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 46: KINONGE RIVER																		
1	July 9/47.....	2073	349	Slow	.....	63·1	(8·2)	(3·0)	7·2 (7·3)	29 (160)	(70)	.....	.....	82·83	63·4	0·0864	.....	23·2	8·8
	STATION No. 47: PETITE NATION RIVER																		
2	July 4/47.....	2040	343	1,920	1,540	71·6	(8·4)	(4·0)	7·8 (7·7)	35 (40)	(16·0)	.....	.....	59·18	45·4	0·0618	234·94	11·6	8·0
	STATION No. 48: PETITE NATION RIVER NEAR																		
3	May 8/47.....	1478	3	4,940	5,360	44·6	.....	.....	7·1	25	7·5	.....	.....	.....	44·0	0·0599	585·89	.....	6·8
4	June 18.....	1521	5	3,820	3,370	60·1	.....	.....	6·9	40	1·1	.....	.....	.....	49·2	0·067	506·76	20·0	7·3
5	July 18.....	1603	24	1,300	1,540	63·0	.....	.....	6·6	37	5·7	.....	.....	.....	72·2	0·1982	252·77	21·6	8·0
6	Aug. 18.....	1635	21	710	705	73·9	.....	.....	6·9	15	2·2	.....	.....	.....	47·4	0·0645	90·67	19·4	7·6
7	Sept. 18.....	1682	34	480	570	64·0	.....	.....	7·3	35	4·2	.....	.....	70·40	62·2	0·0846	80·40	20·0	9·2
8	Oct. 18.....	1707	23	401	420	59·0	.....	.....	7·0	30	1·8	.....	.....	69·19	53·4	0·0727	57·72	13·8	8·6
9	Nov. 18.....	1745	17	374	387	35·1	.....	.....	7·5	55	5·4	.....	.....	137·28	111·4	0·1515	12·19	22·8	16·8
10	Dec. 18.....	1794	41	602	481	34·0	.....	.....	7·5	35	5·4	.....	.....	68·64	52·0	0·0708	84·39	16·0	8·8
11	Jan. 18/48.....	1810	24	380	380	33·1	.....	.....	7·4	30	6·5	.....	.....	66·66	72·8	0·0991	74·56	19·6	8·4
12	Feb. 18.....	1835	9	270	270	32·0	.....	.....	7·2	25	3·6	.....	.....	73·04	56·8	0·0773	41·32	22·4	8·5
13	Mar. 18.....	1881	6	548	1,140	32·0	.....	.....	6·7	60	12·5	.....	.....	89·76	100·2	0·1364	11·80	37·8	8·5
14	April 18.....	1945	9	2,720	3,100	.....	.....	.....	7·0	30	1·1	.....	.....	53·24	47·8	0·065	350·06	28·0	9·6
15	Average (12 samples).....		18	1,379	1,482	48·3	.....	.....	7·1	34·7	4·8	.....	.....	78·53	64·1	0·0956	179·04	21·9	9·0
	STATION No. 48A: BLANCHE																		
16	June 8/49.....	3249	35	.....	.....	59·9	(9·1)	(2·4)	7·4 (7·6)	20 (40)	3·8	5·8	1·6	127·3	54·2	0·0738	.....	14·8	10·1

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
AT HIGHWAY BRIDGE NEAR MOUTH																								
1·5	5·0		.....	0·40	.....	.....	.....	7·8	0	3·5	.....	.....	.....	34·2 (28·1)	0 (0)	.....	7·0	0·2	28·2	5·87	27·9	.....	1·8	1
AT HIGHWAY BRIDGE NEAR MOUTH																								
2·2	2·7		.....	0·10	.....	.....	.....	6·9	0	4·4	.....	.....	.....	29·3 (22·0)	0 (0)	.....	6·4	5·0	29·0	3·64	16·6	.....	1·3	2
PORTAGE DE LA NATION, QUE.—Drainage area, 780 square miles																								
2·1	2·1		.....	0·08	.....	.....	0	7·1	0	3·1	.....	.....	.....	19·0	0	5·8	5·4	9·9	25·5	3·24	15·2	.....	2·2	3
1·3	3·0		.....	0·75	.....	.....	0	8·7	0	2·2	.....	.....	.....	21·5	0	6·4	4·6	5·9	23·5	5·62	21·7	.....	2·3	4
2·3	3·1		.....	0·56	.....	.....	0	7·1	0	3·1	.....	.....	.....	24·2	0	11·6	1·8	9·6	29·4	3·48	18·7	.....	2·6	5
1·8	3·0		.....	0·10	.....	.....	0	7·6	0	2·7	.....	.....	.....	24·2	0	4·4	5·2	6·6	26·4	4·22	19·9	.....	2·3	6
1·9	4·5		.....	0·19	.....	.....	0	8·4	0	1·3	.....	.....	.....	28·3	0	8·8	8·0	7·6	30·8	4·84	24·1	.....	1·7	7
3·5	1·9		.....	0·10	.....	.....	0	8·9	1·2	0·67	.....	.....	.....	30·0	0	4·2	5·2	11·3	35·9	2·46	10·3	.....	2·0	8
3·9	7·5		.....	0·73	.....	.....	0	16·8	1·2	0·62	.....	.....	.....	56·1	0	14·4	9·4	12·0	58·0	4·31	22·0	.....	1·0	9
2·4	4·0		.....	0·13	.....	.....	0	9·4	0·3	1·1	.....	.....	.....	30·0	0	7·2	4·6	7·2	31·8	3·67	21·5	.....	1·5	10
1·6	6·1		.....	0·90	.....	.....	0	11·7	1·9	0·84	.....	.....	.....	29·0	0	15·8	5·6	3·8	27·6	5·25	32·5	.....	1·7	11
2·5	2·5	0·5	.....	0·16	.....	.....	0·07	10·4	1·3	1·1	.....	.....	.....	32·0	0	6·6	4·9	5·4	31·6	3·40	16·3 (14·5)	.....	1·8	12
3·5	3·0	2·0	.....	1·0	.....	.....	0·65	11·5	0	2·7	.....	.....	.....	30·0	0	14·6	6·4	11·1	35·7	2·43	20·3 (14·6)	.....	2·4	13
1·7	1·0	2·0	.....	0·18	.....	.....	Tr.	8·9	0	0·88	.....	.....	.....	19·3	0	5·4	7·2	15·2	31·0	5·65	13·3 (6·1)	.....	2·2	14
2·4	3·7		.....	0·41	.....	.....	.....	9·7	0·40	1·7	.....	.....	.....	28·6	0	8·8	5·7	8·8	32·3	3·75	20·0	.....	1·9	15
RIVER ABOVE THURSO, QUE.																								
1·6	1·7	0·7	.....	0·48	0·008	.....	.....	11·2	0	0·53	.....	.....	.....	34·2 (31·7)	0 (0)	2·4	5·0 (5·5)	3·9	31·9	6·31	12·7 (10·2)	.....	1·5	16

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TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10³ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 49: LIÈVRE RIVER AT BUCKINGHAM,																			
1	May 20/47.....	1479	2	24,050	24,710	46·2	.....	.....	6·8	45	6·9	.....	.....	.....	42·0	0·0572	2791·8	.....	5·4
2	June 17.....	1522	6	10,450	17,540	57·4	.....	.....	6·7	45	1·6	.....	.....	.....	44·6	0·0606	1253·9	19·4	5·4
3	July 12.....	1600	24	6,300	6,710	70·2	.....	.....	6·8	45	2·3	.....	.....	.....	48·0	0·0653	814·6	20·6	5·9
4	Aug. 20.....	1636	19	4,700	5,060	75·2	.....	.....	6·7	37	4·6	.....	.....	.....	47·6	0·0648	610·7	22·8	6·8
5	Sept. 13.....	1663	23	5,090	4,970	71·6	.....	.....	7·2	38	2·1	.....	.....	44·99	44·6	0·0606	610·7	13·4	6·8
6	Oct. 14.....	1701	21	5,430	4,990	54·7	.....	.....	7·4	70	2·6	.....	.....	42·13	46·0	0·0626	673·0	19·6	6·0
7	Nov. 15.....	1741	16	5,290	5,180	43·7	.....	.....	7·2	50	4·7	.....	.....	46·86	44·6	0·0606	634·7	16·2	6·4
8	Dec. 12.....	1785	41	5,290	4,520	32·9	.....	.....	7·4	40	2·6	.....	.....	49·28	47·0	0·0640	670·3	16·2	6·4
9	Jan. 1/48.....	1808	30	4,380	4,090	32·2	.....	.....	6·8	40	4·3	.....	.....	48·84	43·8	0·0596	516·9	18·0	6·2
10	Feb. 12.....	1832	15	4,630	3,590	32·2	.....	.....	6·9	40	4·4	.....	.....	43·67	42·2	0·0574	526·2	18·0	5·9
11	Mar. 12.....	1870	6	3,130	3,560	32·2	.....	.....	6·9	40	2·9	.....	.....	39·82	40·6	0·0552	342·1	17·0	5·8
12	April 12.....	1939	15	4,900	5,180	.....	.....	.....	7·0	35	23·0	.....	.....	62·37	56·4	0·0768	945·1	33·8	7·5
13	May 12.....	2015	20	6,730	7,110	.....	.....	.....	7·0	40	0·5	.....	.....	51·59	47·2	0·0642	855·5	20·8	6·3
14	June 12.....	2135	34	4,500	4,750	.....	.....	.....	7·2	49	1·0	.....	.....	50·49	42·6	0·0580	516·8	12·6	7·9
15	July 10.....	2415	107	4,400	4,150	.....	.....	.....	7·2	20	7·5	7·8	5·2	58·52	42·2	0·0574	500·1	16·0	7·6
16	Aug. 12.....	2324	50	4,400	4,090	.....	.....	.....	6·9	30	8·8	.....	.....	50·05	42·1*	0·0573	499·2	14·9*	10·0
17	Sept. 13.....	2305	8	4,400	4,130	.....	.....	.....	7·1	30	6·6	.....	.....	53·90	42·1*	0·0573	499·2	14·9*	7·5
18	Oct. 12.....	2429	12	4,440	4,080	.....	.....	.....	7·1	20	3·8	6·4	6·0	50·93	42·0	0·0572	502·9	13·8	7·4
19	June 8/49***..	3214	20	.....	.....	59·2	.....	(2·0)	7·1 (6·7)	23 (40)	4·4	.....	.....	68·70	.....	.....	.....	.....	6·4
20	Average (12 samples**)....		18·2	7,025	7,508	.....	.....	.....	7·0	43·8	5·2	.....	.....	47·25	45·6	0·0620	865·8	19·5	6·2
21	Average (18 samples).....		25	6,287	6,578	.....	.....	.....	7·0	39·7	5·0	.....	.....	49·53	44·8	0·0610	764·5	18·1	6·7
STATION No. 50: LIÈVRE																			
22	May 12/47.....	1461	8	24,370	24,710	.....	.....	.....	6·9	45	1·3	.....	.....	.....	42·8	0·0582	2808·3	.....	4·7

*** Not included in averages.

** May 20/47-April 12/48 inclusive.

* Estimated.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
QUE.—Drainage area, 3,700 square miles at Poupore, Que.																								
1·8	2·1		.....	0·056	.....	.....	0	5·6	0	4·0	.....	.....	.....	13·2	0	6·0	5·2	10·1	20·9	3·00	17·9	.....	2·8	1
1·4	2·1		.....	0·31	.....	.....	0·007	7·6	0	2·0	.....	.....	.....	17·8	0	6·2	4·3	4·6	19·2	3·85	19·2	.....	2·8	2
2·1	2·6		.....	0·19	.....	.....	0	6·3	0	2·7	.....	.....	.....	20·5	0	6·8	2·5	6·6	23·4	2·81	19·5	.....	2·6	3
1·7	2·7		.....	0·29	.....	.....	0	5·4	0	2·7	.....	.....	.....	22·7	0	5·6	4·6	5·4	24·0	4·00	19·7	.....	2·5	4
1·6	3·9		.....	0·29	.....	.....	0	5·3	0	0·80	.....	.....	.....	27·6	0	4·6	4·2	1·0	23·6	4·25	26·5	.....	1·9	5
1·2	3·8		.....	0·33	.....	.....	0	7·6	0	0·62	.....	.....	.....	18·5	0	3·4	4·4	4·7	19·9	5·00	29·4	.....	2·0	6
1·3	3·2		.....	0·32	.....	.....	0	7·1	0	0·89	.....	.....	.....	23·9	0	4·4	5·6	1·7	21·3	4·92	24·7	.....	2·0	7
1·8	3·2		.....	0·17	.....	.....	0	6·7	0	1·1	.....	.....	.....	26·6	0	5·0	5·5	1·6	23·4	3·55	23·0	.....	1·8	8
1·1	5·1		.....	0·31	.....	.....	0	8·6	0	0·84	.....	.....	.....	24·4	0	6·6	5·0	0	20·0	5·64	35·7	.....	2·5	9
2·1	2·0	0·5	.....	0·26	.....	.....	0·07	7·6	0	1·3	.....	.....	.....	27·3	0	5·4	3·0	1·0	23·4	2·81	17·6 (15·3)	.....	2·3	10
1·5	3·0	0·5	.....	0·34	.....	.....	0	5·8	0	0·89	.....	.....	.....	23·9	0	5·0	2·6	1·1	20·7	3·87	25·8 (23·5)	.....	2·4	11
1·6	1·0	2·5	.....	0·36	.....	.....	0·10	13·2	0	1·8	.....	.....	.....	21·7	0	6·4	7·2	8·6	26·4	4·68	17·6 (7·1)	.....	2·2	12
1·3	4·7		.....	0·11	.....	.....	0	7·7	0	1·6	.....	.....	.....	17·6	0	4·2	7·6	6·7	21·1	4·85	32·7	.....	2·4	13
1·6	1·5	1·0	.....	0·02	.....	.....	.....	5·5	0	0·53	0·4	.....	.....	18·3	0	3·6	3·6	11·4	26·4	4·94	14·8 (10·6)	.....	2·1	14
1·0	1·5	1·4	.....	0·05	0·05	.....	.....	5·8	0	0·50	0·2	.....	.....	20·7	0	5·2	4·2	6·1	23·1	7·60	18·0 (11·6)	.....	2·0	15
2·3	1·5	0·9	.....	.....	.....	.....	.....	.....	0	.....	.....	.....	.....	9·8	0	.....	4·0	26·4	34·4	4·35	11·3 (9·0)	.....	2·6	16
2·0	1·4	0·9	.....	.....	.....	.....	.....	.....	0	.....	.....	.....	.....	17·1	0	.....	4·6	12·9	26·9	3·75	13·5 (9·8)	.....	2·2	17
2·2	1·3	1·1	.....	0·45	0·06	.....	.....	9·6	0	0·18	0·15	.....	.....	24·4	0	3·8	3·0	7·6	27·6	3·36	13·4 (8·9)	.....	2·1	18
1·1	1·0	0·5	.....	.....	.....	.....	.....	8·3	0	.....	.....	.....	.....	22·0 (14·6)	0 (0)	.....	5·0	2·5	20·5 (21·8)	5·82	13·0 (9·2)	.....	2·2	19
1·6	3·1		.....	0·269	.....	.....	0·015	7·2	0	1·6	.....	.....	.....	22·3	0	5·5	4·5	3·8	22·1	3·88	23·4	.....	2·3	20
1·6	2·9		.....	.....	.....	.....	.....	.....	0	.....	.....	.....	.....	21·2	0	.....	4·5	6·2	23·6	4·19	21·3	.....	2·3	21
RIVER AT POUPORE, QUE.																								
1·8	1·6		.....	0·01	.....	.....	0	6·3	0	3·1	.....	.....	.....	16·3	0	5·2	5·5	5·7	19·1	2·61	15·4	.....	2·6	22

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 51: LIÈVRE RIVER AT																			
1	July 10/47.....	2046	337	.....	.....	68·5	(8·3)	(3·0)	6·8 (7·0)	42 (60)	(<7)	.....	.....	42·13	38·8	0·0528	.....	14·6	5·2
STATION No. 52: LIÈVRE RIVER AT MONT																			
2	May 20/47.....	1480	3	18,790	16,826	.....	.....	.....	6·2	50	0·9	.....	.....	.....	33·0	0·0449	1,670·5	.....	3·2
3	June 20.....	1530	3	9,000	10,499	.....	.....	.....	6·3	55	3·2	.....	.....	.....	39·6	0·0538	958·7	14·0	2·8
4	July—No sample taken.																		
5	Aug. 20.....	1637	19	3,040	2,639	.....	.....	.....	6·4	45	2·0	.....	.....	.....	33·6	0·0457	275·1	19·0	3·2
6	Sept. 20.....	1671	25	2,730	2,824	.....	.....	.....	7·2	50	2·1	.....	.....	34·10	41·0	0·0558	301·6	19·0	4·7
7	Oct. 20.....	1709	21	2,370	2,840	.....	.....	.....	6·4	60	2·0	.....	.....	30·80	36·4	0·0495	232·3	15·8	4·4
8	Nov. 28.....	1773	49	1,270	1,860	.....	.....	.....	6·7	35	4·1	.....	.....	41·03	61·2	0·0833	209·5	15·4	5·2
9	Dec. 31.....	1800	36	2,430	2,430	.....	.....	.....	6·4	40	3·6	.....	.....	32·78	32·8	0·0446	214·6	15·4	3·8
10	Jan. 20/48.....	1807	22	2,320	2,340	.....	.....	.....	6·3	40	3·2	.....	.....	30·36	34·0	0·0462	212·2	18·6	3·2
11	Feb. 20.....	1842	14	2,640	2,670	.....	.....	.....	6·6	50	2·0	.....	.....	24·42	34·0	0·0462	241·5	19·2	2·8
12	Mar. 3.....	1886	4	3,400	2,930	.....	.....	.....	6·5	40	12·5	.....	.....	33·00	40·2	0·0547	368·2	20·6	3·6
13	April 20.....	1960	21	4,550	5,690	.....	.....	.....	6·4	50	18·5	.....	.....	34·65	50·2	0·0683	615·3	29·2	4·0
14	Average (11 samples).....		20	4,776	4,893	.....	.....	.....	6·5	47	4·9	.....	.....	32·64	39·6	0·0538	481·8	18·6	3·7
STATION No. 53: LIÈVRE RIVER AT																			
15	July 10/47.....	2054	341	3,830	3,505	73·4	(8·1)	(3·0)	7·5 (7·3)	50 (65)	(<7)	.....	.....	33·55	36·6	0·0498	377·7	14·4	4·0
STATION No. 54: KIAMIKA RIVER AT																			
16	July 10/47.....	2074	347	.....	.....	70·7	(7·5)	(3·0)	6·8 (7·1)	24 (55)	(<7)	.....	.....	44·55	40·6	0·0552	.....	14·6	5·6

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: ±	Saturation index: −	No.
BRIDGE AT NOTRE DAME DU LAUS, QUE.																									
1·8	3·4*		.....	0·004	.....	.....	.....	6·0	0	1·3	.....	.....	.....	24·4 (14·6)	0 (0)	.....	7·6	0·4	20·4	2·89	26·6	.....	2·7		1
LAURIER, QUE.—Drainage area, 2,100 square miles																									
0·9	1·9		.....	0·07	.....	.....	0	4·3	0	2·7	.....	.....	.....	7·1	0	4·8	4·4	5·9	11·7	3·56	26·8	.....	3·9		2
1·1	2·7		.....	0·40	.....	.....	0	5·4	0	1·8	.....	.....	.....	10·7	0	6·8	4·6	2·7	11·5	2·56	33·4	.....	3·6		3
																									4
1·4	3·1		.....	0·25	.....	.....	0	4·0	0	2·7	.....	.....	.....	9·5	0	3·2	2·4	5·4	13·2	2·29	33·0	.....	3·5		5
0·9	3·0		.....	0·33	.....	.....	0	5·1	0	0·88	.....	.....	.....	14·6	0	5·4	5·4	3·4	15·4	5·22	29·7	.....	2·4		6
2·4	1·0		.....	0·26	.....	.....	0·26	7·2	0	0·63	.....	.....	.....	12·4	0	2·6	4·0	9·6	19·8	1·83	9·5	.....	3·3		7
1·8	4·9		.....	0·46	.....	.....	0	6·4	0	1·3	.....	.....	.....	18·8	0	15·4	5·5	5·0	20·4	2·89	34·3	.....	2·7		8
1·4	4·0		.....	0·24	.....	.....	0	5·4	0	1·3	.....	.....	.....	13·4	0	3·6	3·8	4·2	15·2	2·71	36·4	.....	3·3		9
0·5	5·6		.....	0·26	.....	.....	0·015	7·2	0	0·89	.....	.....	.....	14·6	0	4·4	4·1	0	10·1	6·40	55·1	.....	3·5		10
1·1	1·0	0·5	.....	0·14	.....	.....	0	4·1	0	0·53	.....	.....	.....	13·4	0	4·8	3·4	0·5	11·5	2·56	19·8 (15·3)	.....	3·2		11
1·7	1·0	1·0	.....	0·24	.....	.....	0·02	5·6	0	1·6	.....	.....	.....	11·2	0	6·0	3·8	6·8	16·0	2·12	17·9 (11·2)	.....	3·3		12
1·3	1·0	1·0	.....	0·33	.....	.....	0	5·6	0	2·7	.....	.....	.....	6·8	0	7·6	5·2	9·7	15·3	3·08	18·6 (11·6)	.....	3·6		13
1·3	2·8		.....	0·27	.....	.....	0·027	5·5	0	1·5	.....	.....	.....	12·1	0	5·9	4·2	4·8	14·6	2·84	29·5	.....	3·3		14
BRIDGE AT MONT LAURIER, QUE.																									
0·5	2·7*		.....	0·23	.....	.....	.....	3·9	0	2·2	.....	.....	.....	14·6 (14·6)	0 (0)	.....	8·2	0	12·0	8·00	32·4	.....	2·2		15
BRIDGE EAST OF MONT LAURIER, QUE.																									
1·6	3·5*		.....	0·008	.....	.....	.....	7·7	0	2·6	.....	.....	.....	22·0 (15·9)	0 (0)	.....	7·0	2·6	20·6	3·50	27·1	.....	2·5		16

* Alkalis calculated as Na.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 55: GATINEAU RIVER AT																		
1	Dec. 10/46.....	1288A	25	.....	.....	49·1	.....	.....	7·4	80	12·0	.....	.....	.....	98·5	0·1340	.....	.....	18·2
2	Jan. 3/47.....	1302	10	.....	.....	34·2	.....	.....	8·5	55	2·0	.....	.....	.....	63·0	0·0858	.....	.....	11·8
3	Feb. 7.....	1345	10	.....	.....	34·3	.....	.....	8·5	55	0·6	.....	.....	.....	52·5	0·0714	.....	.....	9·1
4	Mar. 14.....	1393	12	.....	.....	34·2	.....	.....	7·2	40	2·0	.....	.....	.....	49·0	0·0659	.....	.....	8·6
5	April 3.....	1409	12	.....	.....	34·7	.....	.....	7·4	45	5·8	.....	.....	.....	52·5	0·0714	.....	.....	7·2
6	May 3.....	1443	23	.....	.....	39·6	.....	.....	7·5	50	10·0	.....	.....	.....	65·0	0·0884	.....	.....	9·3
7	June-Oct.—No samples taken.																		
8	Nov. 7.....	1712	8	.....	.....	50·0	.....	.....	7·2	65	1·6	.....	.....	36·55	39·4	0·0536	.....	17·4	4·6
9	Dec. 5.....	1767	28	.....	.....	34·3	.....	.....	7·5	50	3·7	.....	.....	40·15	42·4	0·0517	.....	17·2	6·5
10	June 2/49**...	3218	26	.....	.....	61·7	(9·9)	(0·5)	7·3 (7·3)	35 (55)	4·0 (<7)	.....	.....	63·7	.....	.....	.....	.....	7·4
11	Average (8 samples).....		16	.....	.....	38·8	.....	.....	7·7	55	4·7	.....	.....	38·35	57·8	0·0777	.....	17·3	9·4

** Not included in average; sample taken several miles downstream.

	STATION No. 56: GATINEAU RIVER AT POWER																		
12	May 13/47.....	1467	7	38,130	43,820	42·1	.....	.....	6·9	40	4·2	.....	.....	.....	30·6	0·0539	4069·3	.....	5·4
13	June 26.....	1563	6	.....	37,580	61·0	.....	.....	6·7	45	1·7	.....	.....	.....	41·4	0·0564	.....	17·2	4·6
14	July 15.....	1596	21	.....	13,080	68·0	.....	.....	6·5	45	1·4	.....	.....	.....	41·0	0·0558	.....	19·0	5·4
15	Aug. 14.....	1633	15	.....	12,360	69·1	.....	.....	6·6	45	1·3	.....	.....	.....	45·4	0·0618	.....	17·8	5·5
16	Sept. 17.....	1681	35	.....	13,260	70·0	.....	.....	6·7	40	2·3	.....	.....	32·23	35·4	0·0481	.....	15·6	4·4
17	Oct. 17.....	1705	24	.....	13,230	75·0	.....	.....	6·7	45	1·2	.....	.....	36·08	35·8	0·0487	.....	16·0	4·4
18	Nov. 13.....	1739	18	.....	12,790	48·0	.....	.....	6·8	50	2·9	.....	.....	35·97	37·0	0·0504	.....	17·2	4·2
19	Dec. 15.....	1788	38	.....	11,370	34·0	.....	.....	6·7	45	3·0	.....	.....	35·42	39·4	0·0536	.....	16·4	4·2
20	Jan. 17/48.....	1809	25	.....	12,480	34·0	.....	.....	6·8	40	3·6	.....	.....	34·10	36·2	0·0493	.....	16·4	4·1
21	Feb. 12.....	1825	11	.....	10,840	33·6	.....	.....	6·7	40	4·3	.....	.....	32·12	36·8	0·0501	.....	17·2	3·8
22	Mar. 13.....	1868	5	.....	9,990	33·4	.....	.....	6·8	35	1·6	.....	.....	33·55	35·6	0·0484	.....	14·8	4·1
23	April 13.....	1942	14	.....	10,200	.....	.....	.....	7·1	35	2·5	.....	.....	62·04	51·8	0·0705	.....	30·6	7·5
24	Average (12 samples).....		18·3	.....	16,825	.....	.....	.....	6·75	42	2·5	.....	.....	37·69	39·6	0·0539	.....	18·0	4·8

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
POWER PLANT AT FARMER'S RAPIDS, QUE.																								
2·6	1·0		.....	0·57	.....	.....	0	9·5	0	14·0	.....	.....	.....	47·1	0	11·0	.....	16·5	55·1	7·0	3·7	.....	1·1	1
3·3	0·5		.....	0·04	.....	.....	0	6·2	0	5·3	.....	.....	.....	34·2	0	1·5	.....	15·0	43·0	3·58	2·5	.....	0·3	2
1·1	0·5		.....	0·06	.....	.....	0	6·2	0	5·3	.....	.....	.....	21·4	0	0	.....	9·8	27·3	3·28	3·8	.....	0·6	3
1·5	0·7		.....	0·09	.....	.....	0	6·2	0	3·5	.....	.....	.....	19·5	0	5·0	.....	11·7	27·7	5·74	5·2	.....	0·2	4
3·3	0·9		.....	0·05	.....	.....	0	10·3	0	5·3	.....	.....	.....	22·5	0	5·0	.....	13·2	31·6	2·18	5·9	.....	1·0	5
3·1	5·4		.....	0·03	.....	.....	0	11·5	0	4·0	.....	.....	.....	26·4	0	6·0	.....	14·4	36·0	3·0	24·6	.....	1·5	6
																								7
1·8	2·1		.....	0·28	.....	.....	0	6·3	0	0·84	.....	.....	.....	15·1	0	3·0	.....	6·5	18·9	2·56	16·1	.....	2·4	8
1·7	3·0		.....	0·33	.....	.....	0	8·9	0	1·3	.....	.....	.....	15·1	0	5·2	.....	10·9	23·3	3·82	26·4	.....	1·9	9
1·3	1·0	0·6	.....	.....	.....	.....	.....	8·6	0	.....	.....	.....	.....	26·8 (22·0)	0 (0)	.....	4·9	1·8	23·8	5·69	10·9 (8·1)	.....	1·8	10
2·3	1·8		.....	0·18	.....	.....	0	8·1	0	4·9	.....	.....	.....	25·1	0	4·6	.....	12·3	32·9	4·09	10·6	.....	1·4	11
PLANT AT LOW, QUE.—Drainage area, 9,100 square miles																								
1·7	2·1		.....	0·02	.....	.....	0·01	6·6	0	2·2	.....	.....	.....	15·6	0	5·0	5·3	1·4	14·2	3·18	13·3	.....	2·6	12
1·8	2·3		.....	0·29	.....	.....	0·056	6·6	0	1·7	.....	.....	.....	17·1	0	5·4	4·4	4·9	18·9	2·56	20·9	.....	2·8	13
2·3	1·6		.....	0·11	.....	.....	0·02	6·8	0	1·3	.....	.....	.....	17·6	0	4·2	2·5	8·5	22·9	2·35	13·2	.....	3·0	14
1·8	1·6		.....	0·20	.....	.....	0·04	5·9	0	3·0	.....	.....	.....	18·3	0	3·8	3·8	6·2	21·2	3·06	14·1	.....	2·8	15
1·4	2·9		.....	0·25	.....	.....	0	5·8	0	0·89	.....	.....	.....	13·2	0	6·8	3·6	5·9	16·7	3·14	27·4	.....	3·0	16
2·5	1·0		.....	0·23	.....	.....	0	7·9	0	0·75	.....	.....	.....	15·6	0	3·4	3·4	8·5	21·3	1·76	9·3	.....	2·9	17
1·1	3·5		.....	0·23	.....	.....	0·016	5·9	0	0·89	.....	.....	.....	17·1	0	3·2	4·2	0·8	14·8	3·82	32·9	.....	2·8	18
1·6	2·6		.....	0·19	.....	.....	0	5·6	0	1·3	.....	.....	.....	17·1	0	2·6	4·0	3·1	17·1	2·63	14·9	.....	2·9	19
0·9	4·8		.....	0·19	.....	.....	0	10·4	0	1·3	.....	.....	.....	17·1	0	5·2	4·4	0	14·0	4·55	42·8	.....	2·8	26
1·1	1·5	0·3	.....	0·27	.....	.....	Tr.	7·6	0	0·80	.....	.....	.....	14·2	0	5·0	4·4	2·4	14·0	3·46	20·6 (18·5)	.....	3·0	21
1·4	2·5	0·5	.....	0·25	.....	.....	0	7·2	0	0·80	.....	.....	.....	18·1	0	4·6	2·0	1·2	16·0	2·93	27·6 (24.75)	.....	2·8	22
1·7	1·0	0·5	.....	0·18	.....	.....	0·03	7·7	0	1·1	.....	.....	.....	23·9	0	6·2	7·6	6·2	25·8	4·41	10·0 (7·7)	.....	2·1	23
1·6	2·4		.....	0·20	.....	.....	0·01	7·0	0	1·3	.....	.....	.....	17·1	0	4·6	4·1	4·1	18·1	3·00	21·9	.....	2·8	24

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 57: GATINEAU RIVER																			
1	July 25/47.....	2053	326	12,030	13,090	66·4	(8·7)	(3·0)	7·0 (6·9)	40 (65)	..... (<7)	.....	.....	46·64	40·0	0·0544	1,298	14·8	5·6
STATION No. 58: LAKE																			
2	June 19/47.....	1523	4	32,370	32,020	55·9	.....	.....	6·3	50	0·5	.....	.....	.....	33·6	0·0457	2,913	18·8	2·3
3	July 25/47.....	2052	326	12,030	13,090	68·0	(8·0)	(3·5)	7·3 (6·7)	40 (60)	..... (<7)	.....	.....	33·33	31·4	0·04175	996	13·0	3·6
STATION No. 59: RIVIÈRE DÉSERT																			
4	July 24/47.....	2071	329	.....	.....	68·2	(9·0)	(4·0)	7·4 (7·0)	32 (60)	..... (<7)	.....	.....	47·30	43·8	0·0596	.....	13·4	7·2
STATION No. 60: QUYON RIVER																			
5	Aug. 4/47.....	2086	327	.....	.....	73·0	9·4 (8·9)	0 (0)	8·3 (8·3)	38 (50)	13·0	.....	.....	209·55	135·8	0·1848	.....	19·2	28·4
STATION No. 61: COULONGE RIVER ABOVE																			
6	May 5/47.....	1456	6	15,960	14,480	.....	.....	.....	6·4	25	0·9	.....	.....	.....	39·0	0·053	1,675	.....	3·8
STATION No. 62: COULONGE RIVER																			
7	Aug. 5/47.....	1620	20	3,980	3,050	72·5	(8·0)	(2·0)	6·5 (7·2)	60 (57)	1·3 (<7)	.....	.....	.....	59·6	0·081	641	19·8	4·1
STATION No. 63: BLACK RIVER AT																			
8	Aug. 5/47.....	1617	14	1,690	1,110	71·6	7·4 (7·0)	3·0 (3·0)	6·5 (7·1)	50 (45)	1·7 (<7)	.....	.....	.....	41·0	0·0558	187	16·4	3·8

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis as sodium: Sodium (Na)	Alkalis as sodium: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
AT BRIDGE AT MANIWAKI, QUE.																								
0·9	1·8	.....	0·10	.....	.....	.....	5·2	0	2·6	.....	.....	.....	17·1 (14·6)	0 (0)	.....	7·6	3·7	17·7	6·22	17·9	.....	2·4		1
BASKATONG AT MERCIER DAM																								
1·0	3·1	.....	0·18	.....	.....	0	7·2	0	2·2	.....	.....	.....	9·0	0	3·4	4·0	2·4	9·8	2·30	39·9	.....	3·8		2
0·7	0·8	.....	0·08	.....	.....	.....	4·9	0	0·8	.....	.....	.....	9·8 (8·5)	0 (0)	.....	6·2	3·9	11·9	5·14	10·9	.....	2·6		3
AT BRIDGE AT MANIWAKI, QUE.																								
2·4	3·3	.....	0·11	.....	.....	.....	7·5	0	3·1	.....	.....	.....	19·4 (17·6)	0 (0)	.....	10·8	11·8	27·8	3·00	19·8	.....	1·9		4
AT MILL DAM AT QUYON, QUE.																								
6·0	7·9	.....	0·01	.....	.....	0	12·4	6·0	1·7	.....	.....	.....	109·8 (107·3)	0	.....	10·8	5·6	95·6	4·73	15·3	0·33	.....		5
FORT COULONGE—Drainage area, 2,100 square miles																								
1·2	7·1	.....	0·05	.....	.....	0·03	10·3	0	2·6	.....	.....	.....	9·3 (12·2)	0 (0)	2·0	3·6	6·8	14·4	3·17	51·5	.....	3·5		6
AT INTAKE PUMP, FORT COULONGE, QUE.																								
1·8	2·1	.....	0·27	.....	.....	0	6·1	0 (0)	3·5	.....	.....	.....	14·2 (12·2)	0 (0)	4·6	2·5	6·1	17·7	2·28	20·2	.....	3·1		7
DAM NEAR WALTHAM STATION, QUE.																								
1·2	2·5	.....	0·22	.....	.....	0	6·8	0	1·8	.....	.....	.....	12·2 (12·2)	0	3·6	1·5	4·4	14·7	3·17	26·7	.....	3·2		8

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 64: BLACK RIVER																		
1	May 15/47	1476	5	3,870	6,800	.....	.....	.....	6·4	40	0·8	.....	.....	.....	39·2	0·0532	409·0	.....	3·5
2	June 10/47	1511	3	4,410	3,870	.....	.....	.....	6·3	110	3·0	.....	.....	.....	47·0	0·0639	559·0	26·5	3·2
3	July 20	1609	22	2,390	2,070	.....	.....	.....	6·3	60	0·4	.....	.....	.....	41·0	0·0558	265·0	18·8	3·3
4	Aug. 25	1648	21	600	640	.....	.....	.....	6·5	25	0·6	.....	.....	.....	34·2	0·0464	55·2	14·0	4·3
5	Sept. 27	1684	25	780	242	.....	.....	.....	6·8	35	2·7	.....	.....	37·29	37·4	0·0506	78·2	15·0	4·0
6	Oct. 11	1699	24	575	600	.....	.....	.....	7·5	35	1·2	.....	.....	44·88	40·8	0·0555	63·2	15·8	6·0
7	Nov. 21	1749	14	420	584	.....	.....	.....	6·7	35	1·3	.....	.....	39·05	39·0	0·0531	44·4	14·0	4·2
8	Dec. 16	1792	43	335	373	.....	.....	.....	6·9	35	5·7	.....	.....	36·85	38·4	0·0519	34·5	15·2	3·6
9	Jan. 25/48	1813	23	329	329	.....	.....	.....	6·7	40	3·0	.....	.....	39·82	40·2	0·0547	35·7	14·6	4·4
10	Feb. 22	1843	12	226	226	.....	.....	.....	5·9	30	6·6	.....	.....	49·83	43·4	0·0591	26·5	18·4	4·5
11	Mar. 15	1887	9	198	198	.....	.....	.....	6·5	30	2·1	.....	.....	40·04	39·0	0·053	20·8	16·8	4·3
12	April 21	2021	41	2,940	3,210	.....	.....	.....	6·1	50	2·8	.....	.....	37·62	39·4	0·0536	259·6	18·0	4·1
13	Average (12 samples)		20·2	.....	1,595	.....	.....	.....	6·6	44	2·5	.....	.....	40·67	39·9	0·0543	171·7	17·0	4·1
	STATION No. 65: DUMOINE RIVER AT																		
14	Aug. 8/47	2066	318	2,200	1,880	73·4	(7·9)	(3·0)	7·2 (6·9)	32 (60)	<7	.....	.....	31·24	31·6	0·043	187·5	13·6	3·8
	STATION No. 66: GORDON CREEK																		
15	June 9/47	1500	7	.....	.....	.....	.....	.....	6·3	20	1·0	.....	.....	.....	30·6	0·0416	.....	.....	2·6
16	July 9	1591	20	.....	.....	.....	.....	.....	6·5	20	0·6	.....	.....	.....	34·4	0·0467	.....	14·2	3·0
17	Aug. 11	1629	18	.....	.....	.....	.....	.....	6·3	25	0·3	.....	.....	.....	32·6	0·0443	.....	11·4	3·0
18	" 11	2042	305	.....	.....	72·1	(8·1)	(3·5)	6·5 (6·5)	30 (25)	..... (<7)	.....	.....	35·64	31·6	0·043	.....	10·8	3·2
19	Sept.—No sample taken.																		
20	Oct. 1	1688	28	.....	.....	.....	.....	.....	6·7	30	1·6	.....	.....	35·09	32·6	0·0443	.....	12·6	3·2
21	Nov.—No sample taken.																		
22	Dec. 2	1772	45	.....	.....	.....	.....	.....	6·4	30	1·3	.....	.....	30·36	31·8	0·0432	.....	11·8	3·2
23	Average (6 samples)		70	.....	.....	.....	.....	.....	6·45	26	0·8	.....	.....	33·70	32·3	0·0439	.....	12·2	3·0

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: ±	Saturation index: −	No.
AT CULBUTE CHUTE, QUE.																									
1·5	1·8		.....	0·01	.....	.....	0	6·8	0	1·8	.....	.....	.....	8·3	0	4·2	6·2	8·1	14·9	2·33	20·8	.....	3·5		1
1·1	2·9		.....	0·07	.....	.....	0	6·4	0	1·8	.....	.....	.....	7·8	0	.....	4·1	6·1	12·5	2·91	33·5	.....	3·7		2
1·6	1·8		.....	0·16	.....	.....	0·03	6·4	0	2·2	.....	.....	.....	10·5	0	5·0	1·6	6·3	14·9	2·06	20·6	.....	3·6		3
1·0	2·8		.....	0·10	.....	.....	0·007	8·6	0	2·2	.....	.....	.....	13·2	0	1·8	4·0	4·0	14·8	4·30	28·9	.....	2·9		4
1·7	4·0		.....	0·22	.....	.....	0	9·1	0	0·53	.....	.....	.....	10·5	0	4·6	5·2	8·4	17·0	2·35	33·4	.....	2·6		5
1·0	4·5		.....	0·10	.....	.....	0	8·1	0	0·35	.....	.....	.....	19·8	0	4·6	5·4	2·9	19·1	6·00	33·7	.....	1·8		6
1·2	3·6		.....	0·15	.....	.....	0	8·4	0	0·80	.....	.....	.....	14·6	0	4·6	5·2	4·1	15·9	3·50	33·3	.....	2·9		7
1·8	2·9		.....	0·26	.....	.....	0	9·1	0	1·1	.....	.....	.....	14·6	0	6·6	6·0	4·4	16·4	2·00	27·3	.....	2·8		8
2·5	2·0	1·0	.....	0·16	.....	.....	0·09	9·4	0	1·1	.....	.....	.....	19·5	0	5·0	5·8	5·3	21·3	1·76	20·7 (16·0)	.....	2·8		9
1·5	2·5	1·0	.....	0·10	.....	.....	0·09	8·1	0	0·35	.....	.....	.....	20·7	0	6·4	5·8	0·5	17·5	3·00	27·8 (22·5)	.....	3·6		10
1·3	1·5	0·5	.....	0·20	.....	.....	0·01	8·1	0	0·89	.....	.....	.....	15·1	0	5·2	5·0	3·7	16·1	3·31	19·5 (16·3)	.....	3·1		11
1·0	4·2		.....	0·04	.....	.....	0	6·7	0·7	1·3	.....	.....	.....	4·9	0	4·2	7·4	10·4	14·4	4·10	38·9	.....	3·0		12
1·4	3·0		.....	0·13	.....	.....	0·019	7·9	0	1·2	.....	.....	.....	13·3	0	4·7	5·1	5·1	16·0	3·13	29·1	.....	3·1		13
MOUTH—Drainage area, 1,570 square miles																									
1·3	1·4		.....	0·08	.....	.....	.....	5·9	0	2·2	.....	.....	.....	12·2 (9·8)	0	.....	6·2	4·8	14·8	2·92	17·2	.....	2·5		14
(LAKE KIPAWA) AT TIMISKAMING, QUE.																									
1·2	1·9		.....	0·03	.....	.....	0	7·9	0	2·2	.....	.....	.....	8·5	0	2·8	4·2	4·4	11·4	2·17	26·6	.....	2·7		15
1·1	3·5		.....	0·03	.....	.....	0	8·6	0	2·7	.....	.....	.....	8·3	0	3·4	2·0	5·2	12·0	2·73	38·8	.....	3·5		16
1·7	2·2		.....	0	.....	.....	0·025	8·7	0	2·2	.....	.....	.....	6·8	0	2·2	3·8	8·9	14·5	1·77	20·3	.....	3·8		17
0·8	6·6		.....	0·04	.....	.....	.....	13·0	0	2·6	.....	.....	.....	12·2 (8·1)	0	.....	4·4 (3·8)	1·3	11·3	4·00	56·1	.....	3·3		18
																									19
1·8	2·5		.....	0·04	.....	.....	0·003	10·4	0	0·75	.....	.....	.....	8·1	0	3·0	5·1	8·8	15·4	1·78	26·1	.....	3·3		20
																									21
1·6	4·4		.....	0·04	.....	.....	0	9·2	0	1·3	.....	.....	.....	8·4	0	2·6	3·2	7·8	14·6	2·00	39·6	.....	3·6		22
1·4	3·5		.....	0·03	.....	.....	.....	9·65	0	2·0	.....	.....	.....	8·6	0	2·8	3·8	6·1	13·2	2·41	36·5	.....	3·5		23

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids) P.P.M.	Residue on Evaporation (Dissolved solids) Tons per acre-foot	Residue on Evaporation (Dissolved solids) Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 67: KIPAWA RIVER																		
1	Aug. 12/47.....	2104	331	960	730	73·4	(8·1)	(3·0)	7·0 (6·6)	38 (47)	..... (<7)	.....	.....	30·58	30·2	0·0411	78·2	10·2	2·8
	STATION No. 68: RIVIÈRE À LA LOUTRE AT																		
2	Aug. 13/47.....	2108	300	.....	.....	82·4	(7·0)	(1·5)	7·1 (8·2)	37 (40)	..... (38)	.....	.....	132·22	92·4	0·1256	.....	9·0	17·2
	STATION No. 69: RIGAUD																		
3	July 28/47.....	2070	329	.....	.....	78·4	(7·6)	(0)	8·3 (8·4)	33 (50)	10·0 (10)	.....	.....	363·99	228·0	0·310	.....	120·6	26·2
	STATION No. 70: SOUTH NATION																		
4	June 16/47.....	1512	3	2,690	1,430	64·4	(11·9)	(6·0)	7·6 (7·8)	160 (110)	8·8	.....	.....	.....	235·8	0·321	1,712	.....	38·1
	STATION No. 70A: SOUTH NATION																		
5	June 10/47.....	3225	18	.....	.....	67·1	.....	6·0	8·0 (8·3)	110 (98)	4·1 (<7)	5·2	4·0	456·0	298·6	0·406	.....	143·0	60·8
	STATION No. 71: RIDEAU RIVER AT																		
6	Jan. 3/47.....	1301	10	Ice conditions		32·9	.....	.....	7·8	100	2·5	.....	.....	.....	243·5	0·331	.....	.....	51·5
7	Feb. 7.....	1343A	10	"	"	32·2	.....	13·0	7·6	65	1·8	.....	.....	.....	218·5	0·297	.....	.....	46·8
8	Mar. 14.....	1391	12	2,700	3,430	32·9	.....	.....	8·1	37	3·0	.....	.....	.....	179·5	0·244	1,588	.....	41·5
9	April 3.....	1407	12	4,810	9,350	.....	.....	.....	7·6	50	7·0	.....	.....	.....	179·5	0·244	2,328	.....	38·6
10	May 3.....	1441	23	6,840	3,430	43·7	.....	.....	8·1	50	25·0	.....	.....	.....	193·0	0·263	3,568	.....	37·2
11	June 2.....	1494	11	1,800	2,210	.....	.....	.....	7·7	65	0·9	.....	.....	.....	176·2	0·240	857	.....	38·8
12	July 2.....	1568	6	920	1,840	.....	.....	.....	7·5	60	1·0	.....	.....	.....	181·6	0·247	450	74·6	39·8
13	Aug. 1.....	1612	18	1,160	573	.....	.....	.....	7·6	75	1·2	.....	.....	.....	208·0	0·283	651	98·0	41·6
14	Sept. 1.....	1652	27	350	489	.....	.....	.....	7·7	43	6·4	.....	.....	265·10	181·0	0·246	171	44·8	38·2
15	Oct. 1.....	1689	29	436	399	48·2	.....	.....	8·3	40	1·5	.....	.....	238·92	156·2	0·212	184	36·2	34·3
16	Nov. 7.....	1711	8	364	601	48·2	.....	1·7	8·0	35	1·8	.....	.....	249·15	159·0	0·216	156	45·5	34·0
17	Dec. 5.....	1765	28	563	714	32·0	.....	3·5	8·2	35	3·7	.....	.....	269·17	173·8	0·236	264	40·2	39·5
18	Average (12 samples).....		16·2	1,994	2,304	.....	.....	.....	7·9	54·6	4·7	.....	.....	255·58	187·5	0·255	1,022	56·5	40·2

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
AT BRIDGE AT LANIEL, QUE.																								
1·6	0·8	.....	0	.....	.....	.....	.....	7·8	0 (0)	0	0·02	.....	.....	8·8 (7·3)	0	.....	5·2	6·4	13·6	1·75	11·6	.....	2·8	1
TRAFFIC BRIDGE NORTH OF GUIGUES, QUE.																								
4·4	3·5	.....	0·26	.....	.....	0	7·8	0	3·5	.....	.....	.....	70·3	0	.....	10·8	3·4	61·0	3·91	11·0	.....	1·4	2	
RIVER ABOVE RIGAUD, QUE.																								
8·9	39·3	.....	0·02	.....	.....	.....	14·9	3·3 (2·5)	0·80	.....	.....	.....	192·8	4·8	.....	2·2	0	102·0	2·94	45·7	0·53	.....	3	
RIVER AT PLANTAGENET, ONT.																								
10·0	12·4	.....	0·82	.....	.....	0	18·3	19·8	2·7	.....	.....	.....	146·6	0	13·4	2·4	16·2	136·4	3·81	16·6	.....	0·1	4	
RIVER AT CHESTERVILLE, ONT.																								
19·3	5·0	1·0	.....	1·32	0·04	.....	.....	27·5	0	10·6	.....	.....	.....	245·7 (217·2)	0	2·2	2·0	29·7	231·1	3·15	5·0 (4·5)	0·56	.....	5
MOUTH—Drainage area, 1,510 square miles																								
17·5	6·6	.....	0·10	.....	.....	0·16	37·9	2·0	4·4	.....	.....	.....	180·9	0	2·0	.....	53·2	200·5	2·95	6·6	0·27	.....	6	
14·9	4·6	.....	0·04	.....	.....	0·01	27·1	2·2	6·2	.....	.....	.....	172·0	0	2·0	.....	36·6	178·1	3·14	5·3	0·01	.....	7	
11·6	6·4	.....	0·06	.....	.....	0·01	21·0	0	4·0	.....	.....	.....	145·2	0	3·5	.....	32·2	151·2	3·57	8·4	0·39	.....	8	
12·2	6·8	.....	0·21	.....	.....	0·05	23·1	0	5·2	.....	.....	.....	151·8	0	6·5	.....	22·1	146·5	3·16	9·2	0·10	.....	9	
13·3	5·8	.....	0·37	.....	.....	0·001	23·1	0	3·5	.....	.....	.....	144·7	0	10·5	8·4	28·9	147·5	2·80	7·9	.....	0·3	10	
10·9	4·0	.....	0·03	.....	.....	0·20	14·8	0	2·7	.....	.....	.....	158·6	0	3·0	1·6	15·4	145·4	3·56	8·7	.....	0·01	11	
12·2	3·6	.....	0·28	.....	.....	0	12·0	0	1·8	.....	.....	.....	158·6	0	5·2	1·8	19·5	149·5	3·26	5·0	.....	0·2	12	
15·5	1·6	.....	0·32	.....	.....	0	11·1	0	1·8	.....	.....	.....	174·7	0	6·5	1·4	24·3	167·6	2·68	2·1	.....	0·03	13	
12·1	4·7	.....	0·11	.....	.....	0	9·1	0	1·2	.....	.....	.....	161·3	0	3·2	3·0	12·9	145·1	3·16	9·7	0	.....	14	
11·2	3·0	.....	0·10	.....	.....	0	15·7	0	0·35	.....	.....	.....	139·3	0	4·4	4·2	17·4	131·6	3·06	4·8	0·51	.....	15	
12·5	3·0	.....	0·02	.....	.....	0·013	21·0	0	0·53	.....	.....	.....	141·6	0	7·0	1·2	20·4	136·4	2·72	4·6	0·01	.....	16	
11·1	6·5	.....	0·11	.....	.....	0	20·3	1·6	0·84	.....	.....	.....	151·0	0	4·2	2·6	20·4	144·2	3·59	13·1	0·49	.....	17	
12·9	4·7	.....	0·15	.....	.....	0·04	19·7	0·5	2·7	.....	.....	.....	156·6	0	4·8	3·0	25·3	153·6	3·12	9·8	0·23	.....	18	

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 conduetanee K x 10⁶ at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 72: RIDEAU RIVER AT																		
1	Mar. 7/47.....	1384	6	.....	.....	.....	.....	.....	7·5	30	0·9	.....	.....	.....	151·5	0·206	.....	.....	32·9
2	April to Aug.—No samples taken.																		
3	Sept. 26.....	2025	252	.....	.....	51·4	(9·7)	(2·5)	8·3 (7·9)	40 (30)	..... (<7)	.....	.....	179·41	110·6	0·150	.....	46·2	26·4
	STATION No. 73: TAY																		
4	Sept. 25/47.....	2107	316	.....	.....	57·6	9·6	2·0	8·2 (7·9)	30 (45)	..... (<7)	.....	.....	156·86	103·6	0·141	.....	17·0	22·0
	STATION No. 74: MISSISSIPPI																		
5	April 6/48.....	1935	15	.....	.....	.....	.....	.....	7·4	50	2·1	.....	.....	168·08	122·6	0·167	.....	50·2	28·6
	STATION No. 75: MISSISSIPPI RIVER																		
6	Sept. 15/47.....	2035	269	410	394	73·4	(6·6)	(2·8)	8·3 (7·9)	38 (65)	..... (<7)	.....	.....	217·69	144·8	0·197	160	29·0	32·4
	STATION No. 76: MISSISSIPPI RIVER NEAR																		
7	May 6/47.....	1446	4	5,320	3,910	.....	.....	.....	7·8	40	2·5	.....	.....	.....	106·0	0·144	1,521	.....	21·4
	STATION No. 77: MISSISSIPPI RIVER																		
8	Mar. 7/47.....	1385	6	1,340	1,890	.....	.....	.....	7·5	40	0·7	.....	.....	.....	148·0	0·201	534	.....	35·0
	STATION No. 78: SHARBOT LAKE																		
9	Sept. 25/47.....	2092	279	410	394	59·0	(9·4)	(2·5)	7·0 (7·9)	12 (40)	..... (<7)	.....	.....	207·57	131·6	0·179	146	24·4	30·4
	STATION No. 79: MADAWASKA RIVER																		
10	Sept. 15/47.....	2036	269	1,380	1,490	73·0	(7·4)	(6·0)	8·0 (7·9)	32 (65)	(10·0)	.....	.....	119·68	85·6	0·116	318	22·4	16·8

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
INTAKE TO WATER WORKS, SMITHS FALLS, ONT.																								
7·2	5·0	.....	0·04	.....	.....	0·01	18·5	0	3·5	.....	.....	0·03	107·8	0	3·0	.....	23·3	111·7	4·57	8·9	.....	0·4	1
																							2
7·3	.....	.....	0·06	.....	.....	.....	10·4	0	4·0	.....	.....	.....	86·4 (87·8)	0	.....	4·0	25·1	95·9	3·62	.....	0·22	.....	3
RIVER AT PERTH, ONT.																								
5·3	4·9*	.....	0·004	.....	.....	.....	13·2	0	6·2	0·03	.....	.....	76·4 (74·4)	0 (0)	.....	8·6	14·1	76·7	4·15	12·8	.....	0·03	4
RIVER AT GALETTA, ONT.																								
5·9	2·5	1·0	.....	0·19	.....	.....	0	12·8	0	2·2	.....	.....	.....	88·8	0	8·4	4·0	22·9	95·7	4·85	5·4	.....	0·7	5
AT HIGHWAY 17 TRAFFIC BRIDGE																								
7·2	0·4*	.....	0·05	.....	.....	Tr.	8·8	0	2·8	.....	.....	.....	117·1 (122·0)	2·4	.....	12·6	10·2	110·2	4·50	8·5	0·43	.....	6
APPLETON, ONT.—Drainage area, 1,150 square miles																								
6·6	8·1	.....	0·03	.....	.....	0	18·5	0	2·7	.....	.....	.....	79·1	0	2·5	4·4	15·8	80·6	3·24	17·9	.....	0·5	7
AT CARLETON PLACE, ONT.																								
7·0	5·6	.....	0·03	.....	.....	.....	20·6	0	3·5	.....	.....	0	105·7	0	5·0	.....	29·5	116·1	5·00	11·2	.....	0·4	8
NEAR SHARBOT LAKE, ONT.																								
7·2	0·6*	.....	0·01	.....	.....	.....	18·1	0	3·5	.....	.....	.....	103·7 (100)	0	.....	5·8	20·5	105·5	4·22	1·1	.....	1·0	9
AT WATER WORKS, ARNPRIOR, ONT.																								
3·2	2·6*	.....	0·06	.....	.....	.....	8·1	0	4·1	.....	.....	.....	59·8 (58·6)	0 (0)	.....	10·0 (4·0)	6·1	55·1	5·25	9·4	.....	0·4	10

* Alkalis calculated as Na.

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TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 80: MADAWASKA RIVER ABOVE																		
1	May 9/47	1458	5	16,550	12,190				7·4	45	1·0				72·5	0·099	3,250		12·6
2	June 12	1504	4	8,090	7,220				7·4	40	0·7				72·6	0·099	1,590		14·1
3	July 7	1590	22	1,490	3,250				7·4	40	8·5				84·2	0·115	340	32·6	15·2
4	Aug. 9	1624	16	2,110	1,520				7·3	45	1·4				77·6	0·105	440	34·2	15·9
5	Sept. 13	1664	23	985	1,490				7·5	35	2·6			100·43	80·6	0·110	215	18·6	16·8
6	Oct. 18	1706	23	1,170	1,690				7·4	35	1·7			90·64	70·2	0·095	220	18·6	13·5
7	Nov. 8	1734	18	1,180	1,960				7·4	35	2·5			83·05	65·2	0·089	208	18·6	11·0
8	Dec. 5	1779	42	2,110	2,110				7·5	30	1·0			77·22	63·6	0·087	364	18·2	10·5
9	Jan. 2/48	1799	34	2,150	2,150				7·5	35	6·6			76·01	70·0	0·095	405	22·4	10·4
10	Feb. 6	1823	17	2,240	2,240				7·3	35	5·1			71·39	61·8	0·084	373	23·2	9·0
11	Mar. 6	1873	12	2,700	2,700				7·1	35	5·1			64·90	55·8	0·076	407	22·0	8·0
12	April 10	1937	11	7,650	7,270				7·3	45	1·5			106·37	83·0	0·113	1,714	32·2	20·5
13	Average (12 samples)		19·1		3,816				7·4	37·9	3·1			83·75	71·4	0·098	794	24·1	13·3
	(Records at Whitney)																		
	STATION No. 81: BARK LAKE AT DAM NEAR BARRY'S																		
14	May 19/47	1477	2	1,580	2,500				7·0	35	0·5				38·0	0·052	163		4·0
15	June 6	1495	11	1,450	975				6·8	35	0·9				37·8	0·051	147		3·5
16	July 6	1576	9	520	398				6·7	37	0·9				38·8	0·053	55	19·0	3·6
17	Aug. 8	1618	14	254	197				6·5	38	1·0				42·0	0·057	29	16·2	3·3
18	Sept. 2	1657	27	145	125				7·3	35	2·6			37·29	36·0	0·049	14	16·4	4·1
19	17**	2118	208	107	125	68·0	(7·7)	(4·0)	7·6 (7·1)	35 (35)	..... (<7)			42·02	42·0	0·057	12	12·0	4·6
20	Oct. 6	1694	29	202	134				7·1	35	2·9			38·72	35·8	0·049	20	17·2	3·8
21	Nov. 3	1724	18	324	358				6·7	35	3·5			37·29	35·6	0·048	31	15·0	3·6
22	Dec. 8	1781	45	502	411				7·0	35	2·0			35·86	38·4	0·052	52	17·2	4·2
23	Jan. 4/48	1801	32	276	207				6·9	35	3·2			37·73	38·6	0·053	29	14·4	3·8
24	Feb. 2	1817	16	163	143				6·7	40	1·9			38·72	36·4	0·050	16	15·8	3·8
25	29	1844	5	137	143				6·5	35	2·5			37·95	39·4	0·054	15	18·2	5·3
26	April 5	1933	16						6·5	40	1·5			40·37	38·8	0·053		16·4	5·6
27	Average (12 samples)		18·7		508				6·8	36·2	1·9			37·99	38·0	0·052	52	16·6	4·05

** Not included in average.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index:		Saturation index: −	No.
ARNPRIOR—Drainage area, 3,185 square miles																									
2·7	9·7		.....	0·05	.....	.....	0	15·6	0	2·7	.....	.....	.....	38·8	0	4·5	5·6	10·8	42·6	4·67	33·1	.....		1·4	1
2·8	1·3		.....	0	.....	.....	0	9·9	0	3·1	.....	.....	.....	46·8	0	5·0	4·8	8·4	46·8	5·04	5·8	.....		1·2	2
3·3	4·5		.....	0·23	.....	.....	0	9·4	0	2·7	.....	.....	.....	53·2	0	9·4	2·9	7·8	51·4	4·61	17·3	.....		1·1	3
3·3	2·5		.....	0·12	.....	.....	0	7·9	0	3·5	.....	.....	.....	53·9	0	6·2	2·8	9·0	53·2	4·82	9·3	.....		1·2	4
3·1	4·4		.....	0·23	.....	.....	0	8·6	0	0·7	.....	.....	.....	54·9	0	6·2	5·1	9·6	54·6	5·42	14·9	.....		1·0	5
4·8	0·7		.....	0·14	.....	.....	0	10·7	0	0·53	.....	.....	.....	44·4	0	6·8	5·2	17·2	53·6	2·81	2·7	.....		1·3	6
2·7	3·2		.....	0·18	.....	.....	0	11·5	0	0·53	.....	.....	.....	40·7	0	4·8	5·6	5·2	38·6	4·07	15·2	.....		1·4	7
2·8	3·9		.....	0·28	.....	.....	0	10·4	0	1·3	.....	.....	.....	37·6	0	6·8	4·0	7·0	37·8	3·75	18·4	.....		1·5	8
4·3	1·4		.....	0·25	.....	.....	0	10·5	0	0·89	.....	.....	.....	34·4	0	10·6	4·8	15·4	43·6	2·42	6·5	.....		1·4	9
2·7	2·0	1·0	.....	0·25	.....	.....	0·05	11·5	0	0·75	.....	.....	.....	32·9	0	8·2	4·8	6·6	33·6	3·33	14·4 (11·1)	.....		1·7	10
2·8	3·0	0·5	.....	0·24	.....	.....	0	9·2	0	0·89	.....	.....	.....	31·5	0	6·4	2·6	5·7	31·5	2·86	20·2 (18·3)	.....		1·9	11
3·3	1·5	0·5	.....	0·13	.....	.....	0·11	10·0	0·7	1·3	.....	.....	.....	53·2	0	7·0	4·4	21·2	64·8	6·21	5·7 (4·7)	.....		1·1	12
3·2	3·3		.....	0·175	.....	.....	.....	10·4	.....	1·6	.....	.....	.....	43·5	0	6·8	4·4	10·3	46·0	4·17	13·4	.....		1·3	13
BAY—Drainage area, 530 square miles at Madawaska																									
2·6	1·6		.....	0·06	.....	.....	0	7·4	0	3·5	.....	.....	.....	12·2	0	3·0	5·0	10·7	20·7	1·54	14·5	.....		2·7	14
1·6	2·2		.....	0·03	.....	.....	0	8·1	0	2·7	.....	.....	.....	11·7	0	3·4	4·0	5·8	15·4	2·19	24·0	.....		3·0	15
2·4	0·9		.....	0·10	.....	.....	0·06	7·7	.....	2·1	.....	.....	.....	11·0	0	3·8	2·5	9·9	18·9	1·50	9·4	.....		3·1	16
1·3	3·4		.....	0·03	.....	.....	0	8·1	.....	2·7	.....	.....	.....	9·8	0	2·8	1·2	5·6	13·6	2·54	35·2	.....		3·4	17
1·1	4·3		.....	0·01	.....	.....	0	7·9	0	0·75	.....	.....	.....	10·0	0	2·0	4·0	6·6	14·8	3·73	38·8	.....		2·5	18
1·3	0·9*		.....	0·02	.....	.....	.....	7·5	0	0·70	.....	.....	.....	12·7 (9·8)	0 (0)	7·8	10·1	6·4	16·8	3·54	10·2	.....		2·0	19
1·2	4·3		.....	0·08	.....	.....	0·02	8·7	0	0·68	.....	.....	.....	12·2	0	2·4	2·8	4·4	14·4	3·12	39·4	.....		2·6	20
1·7	3·5		.....	0·07	.....	.....	0·003	7·2	0	0·89	.....	.....	.....	12·2	0	2·8	3·0	6·0	16·0	2·12	32·2	.....		3·1	21
2·4	1·9		.....	0·10	.....	.....	0	9·5	0	1·1	.....	.....	.....	14·4	0	1·0	3·8	8·4	20·2	1·75	16·9	.....		2·6	22
2·4	2·9		.....	0·13	.....	.....	0	9·2	0	1·1	.....	.....	.....	12·7	0	4·6	3·4	8·9	19·3	1·58	24·6	.....		2·8	23
2·8	2·1	1·0	.....	0·10	.....	.....	0·05	12·5	0	1·1	.....	.....	.....	14·9	0	3·8	3·6	8·8	21·0	1·36	21·8 (16·9)	.....		3·0	24
1·7	2·0	0·7	.....	0·08	.....	.....	0	8·4	0	0·44	.....	.....	.....	14·2	0	4·2	2·6	8·7	20·3	3·12	20·6 (17·0)	.....		3·0	25
2·2	2·5	1·0	.....	0·17	.....	.....	0·10	8·9	3·0	1·3	.....	.....	.....	11·5	0	5·0	4·4	13·6	23·0	2·55	22·7 (18·3)	.....		3·1	26
1·9	2·8		.....	0·08	.....	.....	0·02	8·6	.....	1·5	.....	.....	.....	12·2	0	3·2	3·4	8·1	18·1	2·13	25·3	.....		2·9	27

* Alkalis calculated as Na.

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TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids) P.P.M.	Residue on Evaporation (Dissolved solids) Tons per acre-foot	Residue on Evaporation (Dissolved solids) Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 82: YORK RIVER NEAR																		
1	May 5/47	1447	5	2,970	1,730	.....	.....	.....	6·8	30	1·0	.....	.....	.....	54·0	0·073	430	.....	5·7
2	June 3	1498	10	1,000	645	.....	.....	.....	6·9	45	0·7	.....	.....	.....	45·2	0·061	121	.....	6·3
3	July 3	1572	12	362	402	.....	.....	.....	6·9	40	0·8	.....	.....	.....	49·0	0·066	47	20·4	6·9
4	Aug. 4	1616	15	394	314	.....	.....	.....	6·7	45	0·9	.....	.....	.....	53·2	0·073	57	22·0	7·0
5	Sept. 3	1653	26	255	242	.....	.....	.....	7·7	37	2·0	.....	.....	58·85	50·0	0·068	34	19·6	7·2
6	Oct. 3	1735	59	215	.....	.....	.....	.....	6·9	35	2·4	.....	.....	56·98	51·2	0·070	30	19·2	7·0
7	Nov. 3	1726	19	176	.....	.....	.....	.....	7·0	35	4·0	.....	.....	58·74	49·2	0·067	23	16·4	8·1
8	Average (7 samples)		20·9	.....	667	.....	.....	.....	6·98	38·1	1·7	.....	.....	58·19	50·2	0·068	106	19·5	6·9
	STATION No. 83: OPEONGO RIVER																		
9	Aug. 18/47	2106	264	.....	.....	64·4	(8·2)	(3·0)	7·3 (7·0)	32 (40)	(<7)	.....	.....	43·56	86·2	0·117	.....	14·4	4·0
	STATION No. 84: BONNECHÈRE RIVER NEAR																		
10	May 16/47	1475	5	3,550	3,630	.....	.....	.....	7·8	45	4·2	.....	.....	.....	109·8	0·1494	1,082	.....	20·3
11	June 6	1499	7	2,230	1,840	.....	.....	.....	7·8	50	0·9	.....	.....	.....	109·6	0·1490	659	.....	20·9
12	July 2	1574	13	975	930	.....	.....	.....	7·6	45	2·9	.....	.....	.....	135·2	0·1840	356	55·8	25·4
13	Aug. 4	1615	15	790	585	.....	.....	.....	7·5	38	9·0	.....	.....	.....	143·4	0·1952	306	50·8	30·2
14	Sept. 1	1655	28	423	383	.....	.....	.....	7·5	35	7·0	.....	.....	161·70	126·2	0·1717	144	29·4	22·8
15	Oct. 3	1691	25	379	348	.....	.....	.....	8·0	35	3·1	.....	.....	202·07	130·0	0·1769	133	51·2	27·3
16	Nov. 4	1725	17	318	316	.....	.....	.....	7·4	45	10·0	.....	.....	187·11	137·4	0·1870	118	26·8	24·1
17	" 28	1777	49	302	316	.....	.....	.....	8·0	30	1·3	.....	.....	197·34	133·2	0·1813	109	30·2	26·2
18	Dec. 31	1798	36	280	280	.....	.....	.....	7·6	30	5·1	.....	.....	182·05	123·2	0·1676	93	43·2	23·6
19	Jan. 1948	No sample taken; Nov. 28th and Dec. 31st samples considered as Dec. and Jan. samples respectively.																	
20	Feb. 4	1821	19	212	212	.....	.....	.....	7·5	35	6·1	.....	.....	175·01	120·6	0·1641	69	45·4	21·5
21	Mar. 3	1850	7	346	346	.....	.....	.....	7·6	65	8·1	.....	.....	193·82	133·6	0·1818	125	47·2	23·9
22	April 5	1932	16	1,180	1,390	.....	.....	.....	7·5	40	8·0	.....	.....	205·81	150·8	0·2051	484	57·6	33·6
23	May 4**	1964	7	1,270	1,140	.....	.....	.....	7·8	37	3·0	.....	.....	134·64	96·6	0·1313	511	57·2	17·2
24	Average (12 samples)		18·1	.....	881	.....	.....	.....	7·6	41·1	5·5	.....	.....	188·11	129·4	0·1761	307	43·8	24·9

** Not included in average.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
BANCROFT—Drainage area, 374 square miles																								
2·4	8·4	.....	.....	0·08	.....	.....	0	16·5	0	3·5	.....	.....	.....	13·2	0	3·5	6·2	13·3	24·1	2·38	43·1	.....	2·7	1
1·8	2·6	.....	.....	0·02	.....	.....	0	8·7	0	3·5	.....	.....	.....	16·1	0	4·6	5·0	9·9	23·1	3·50	19·6	.....	2·5	2
2·4	1·7	.....	.....	0·26	.....	.....	0·06	9·5	0	2·6	.....	.....	.....	21·0	0	4·4	3·2	9·9	27·1	2·88	14·3	.....	2·4	3
1·8	3·2	.....	.....	0·17	.....	.....	0·01	9·6	0	1·3	.....	.....	.....	20·0	0	5·6	1·8	8·5	24·9	3·89	21·8	.....	2·6	4
1·5	4·0	.....	.....	0·21	.....	.....	0	9·1	0	1·3	.....	.....	.....	20·2	0	3·4	5·2	7·6	24·2	4·80	26·5	.....	1·6	5
1·8	3·9	.....	.....	0·20	.....	.....	0	9·7	0	1·3	.....	.....	.....	24·4	0	5·0	7·3	4·9	24·9	3·89	25·5	.....	2·3	6
1·9	3·6	.....	.....	0·15	.....	.....	0	8·6	0	0·80	.....	.....	.....	23·7	0	3·6	6·2	8·7	28·1	4·26	21·9	.....	2·1	7
1·9	3·9	.....	.....	0·176	.....	.....	0·01	10·2	0	2·0	.....	.....	.....	19·8	0	4·3	4·9	8·97	25·2	3·63	25·3	.....	2·3	8
AT HIGHWAY No. 60 BRIDGE																								
1·6	1·4*	.....	.....	0	.....	.....	.....	6·9	0	1·3	0·2	.....	.....	13·9 (12·9)	0 (0)	.....	4·5	5·2	16·6	2·50	15·5	.....	2·4	9
CASTLEFORD, ONT.—Drainage area, 935 square miles																								
6·2	3·0	.....	.....	0·003	.....	.....	0·02	12·8	0	1·7	.....	.....	.....	75·6	0	8·0	6·7	14·2	76·2	3·27	7·9	.....	0·5	10
6·3	4·0	.....	.....	0·036	.....	.....	0	12·3	0	2·7	.....	.....	.....	81·7	0	5·6	4·2	11·1	78·1	3·32	10·0	.....	0·4	11
8·0	3·6	.....	.....	0·46	.....	.....	0	11·7	.....	3·5	.....	.....	.....	100·0	0	10·8	3·4	14·3	96·3	3·18	7·4	.....	0·5	12
9·1	4·0	.....	.....	0·23	.....	.....	0	11·7	.....	2·2	.....	.....	.....	122·2	0	10·0	1·9	12·7	112·9	3·31	15·7	.....	0·7	13
6·3	7·1	.....	.....	0·34	.....	.....	0	11·5	.....	1·1	.....	.....	.....	88·1	0	12·2	10·4	10·6	82·8	3·62	5·9	.....	0·4	14
8·0	9·3	.....	.....	0·08	.....	.....	0	15·2	1·0	0·53	.....	.....	.....	103·0	0	6·4	7·2	16·6	101·0	3·41	16·7	.....	0·1	15
6·8	6·5	.....	.....	0·60	.....	.....	0	12·5	2·3	0·84	.....	.....	.....	95·4	0	14·4	6·2	9·9	88·1	3·54	13·9	.....	0·7	16
8·4	3·4	.....	.....	0·10	.....	.....	0	15·6	2·5	1·1	.....	.....	.....	103·2	0	7·8	5·5	15·3	99·9	3·12	6·9	.....	0·0	17
7·9	5·6	.....	.....	0·08	.....	.....	0	8·9	1·6	0·84	.....	.....	.....	95·4	0	8·2	6·4	13·2	91·4	2·99	11·8	.....	0·5	18
																								19
7·3	3·5	1·0	.....	0·18	.....	.....	Tr.	14·2	0	0·84	.....	.....	.....	87·8	0	12·0	7·2	11·7	83·7	2·94	9·5 (8·2)	.....	0·7	20
8·8	3·5	1·5	.....	0·30	.....	.....	0·10	13·0	1·8	0·80	.....	.....	.....	104·2	0	10·8	6·0	10·3	95·7	2·71	9·0 (7·2)	.....	0·5	21
7·3	4·0	1·0	.....	0·34	.....	.....	0	14·3	1·8	1·8	.....	.....	.....	113·2	0	11·3	5·9	21·1	113·9	4·60	8·1 (7·0)	.....	0·4	22
3·7	4·0	1·5	.....	0·15	.....	.....	0·13	12·0	0	0·89	.....	.....	.....	63·4	0	7·2	6·6	6·2	58·2	4·65	15·4 (12·7)	.....	0·6	23
7·5	5·0		.....	0·23	.....	.....	.....	12·8	1·2	1·5	.....	.....	.....	97·5	0	9·8	5·9	13·4	93·3	3·32	10·5	.....	0·5	24

* Alkalis calculated as Na.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^3 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 85: BONNECHÈRE																		
1	Sept. 16/47.....	2031	268	1,750	1,490	71·2	.....	(4·5)	8·1 (7·5)	32 (40)	(<7)	.....	.....	138·16	95·2	0·1293	449	38·0	17·4
	STATION No. 86:																		
2	Sept. 17/47.....	2101	262	.....	.....	68·0	(8·0)	(3·0)	8·4 (7·5)	32 (35)	(<7)	.....	.....	85·58	64·2	0·0874	.....	18·4	10·4
	STATION No. 87: INDIAN																		
3	Aug. 6/48.....	1621	19	.....	.....	78·3	(7·0)	(5·0)	6·7 (7·4)	110 (100)	2·7	.....	.....	.....	67·6	0·0919	.....	31·2	6·2
	STATION No. 88: PETAWAWA RIVER ABOVE																		
4	May 9/47.....	1457	5	11,040	8,730	.....	.....	.....	6·6	60	2·2	.....	.....	.....	46·0	0·0626	1368·4	.....	6·4
5	June 4.....	1496	9	5,800	5,160	.....	.....	.....	6·8	50	0·8	.....	.....	.....	41·6	0·0566	650·0	.....	3·9
6	July 4.....	1575	11	3,070	2,770	.....	.....	.....	6·7	50	0·8	.....	.....	27·94	44·6	0·0606	368·4	19·2	4·1
7	Aug. 4.....	1619	21	1,980	1,750	.....	.....	.....	6·5	40	1·0	.....	.....	.....	42·6	0·0588	230·5	23·0	4·1
8	" 7**.....	2049	313	1,900	1,750	75·2	(7·6)	(4·5)	7·1 (7·1)	39 (45)	(<7)	.....	.....	45·87	42·2	0·0574	215·9	17·6	4·7
9	Sept. 4.....	1659	32	1,490	1,660	.....	.....	.....	7·1	35	2·2	.....	.....	39·82	40·2	0·0547	161·4	13·8	4·8
10	Oct. 4.....	1693	26	1,970	1,730	.....	.....	.....	7·0	35	2·2	.....	.....	44·22	39·0	0·0530	206·7	16·2	4·4
11	Nov. 4.....	1732	22	1,190	1,370	.....	.....	.....	6·8	35	1·1	.....	.....	41·91	37·6	0·0512	120·6	14·6	4·1
12	Dec. 4.....	1778	43	1,530	1,620	.....	.....	.....	7·3	35	1·3	.....	.....	40·15	38·0	0·0517	156·6	14·2	4·2
13	Jan. 5/48.....	1802	31	1,720	1,650	.....	.....	.....	6·8	30	2·4	.....	.....	43·89	39·2	0·0532	181·2	15·6	4·5
14	Feb. 3.....	1818	14	1,500	1,430	.....	.....	.....	6·9	50	3·0	.....	.....	43·89	40·2	0·0547	162·5	16·0	4·3
15	Mar. 3.....	1851	7	1,350	1,900	.....	.....	.....	6·7	70	3·4	.....	.....	46·42	44·0	0·0599	124·5	17·0	4·4
16	April 5.....	1934	16	4,500	5,950	.....	.....	.....	6·7	55	1·5	.....	.....	41·25	47·6	0·0648	577·4	19·6	7·8
17	Average (12 samples).....		19·8	3,095	2,977	.....	.....	.....	6·8	45·4	1·8	.....	.....	41·24	41·7	0·0568	358·9	16·9	4·8

** Not included in average.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
RIVER AT RENFREW, ONT.																								
5·2	2·2*	.....	.....	0·06	.....	.....	0·001	10·0	0	3·9	.....	.....	.....	68·3 (68·3)	0 (0)	.....	9·4 (5·5)	8·8	64·8	3·35	6·7	.....	0·2	1
GOLDEN LAKE																								
3·3	2·8*	.....	.....	0·04	.....	.....	.....	8·7	0	3·1	.....	.....	.....	36·6 (36·6)	2·4	.....	7·6	5·5	39·5	3·15	13·4	.....	0·4	2
RIVER NEAR PEMBROKE, ONT.																								
3·2	3·2	.....	.....	0·80	.....	.....	0·07	6·8	0 (0)	4·4	.....	.....	.....	26·1 (26·8)	0 (0)	9·4	4·0	7·2	28·6	1·94	19·5	.....	2·5	3
PETAWAWA, ONT.—Drainage area, 1,572 square miles																								
4·2	2·6	.....	.....	0·05	.....	.....	0	12·4	0	2·7	.....	.....	.....	12·0	0	3·5	5·8	23·5	33·3	1·52	14·6	.....	3·0	4
1·8	2·6	.....	.....	0·03	.....	.....	0	8·2	0	2·7	.....	.....	.....	12·2	0	3·4	3·8	7·2	17·2	2·17	24·8	.....	3·0	5
2·5	1·7	.....	.....	0·24	.....	.....	0	8·4	0	2·2	.....	.....	.....	12·9	0	4·8	3·0	9·9	20·5	1·64	15·3	.....	3·0	6
2·5	3·1	.....	.....	0·22	.....	.....	0	7·6	0	1·8	.....	.....	.....	11·0	0	2·8	0·6	11·6	20·6	1·64	24·7	.....	3·3	7
1·3	2·9*	.....	.....	0·15	.....	.....	.....	6·4	0	3·5	.....	.....	.....	17·1 (14·6)	0 (0)	.....	7·0	3·1	17·1	3·62	27·0	.....	2·4	8
2·3	2·7	.....	.....	0·15	.....	.....	0	6·6	0	0·88	.....	.....	.....	17·3	0	3·2	4·8	7·2	21·4	2·09	32·1	.....	2·4	9
1·8	3·5	.....	.....	0·14	.....	.....	0	9·2	0	0·53	.....	.....	.....	14·4	0	3·0	4·4	6·6	18·4	2·44	29·3	.....	2·6	10
2·0	3·2	.....	.....	0·12	.....	.....	0	9·9	0	0·62	.....	.....	.....	17·1	0	2·6	3·2	4·4	18·4	2·05	27·4	.....	2·8	11
2·5	2·5	.....	.....	0·002	.....	.....	0	9·9	0	1·1	.....	.....	.....	16·3	0	3·4	3·5	7·4	20·8	1·68	20·8	.....	2·3	12
3·0	2·3	.....	.....	0·16	.....	.....	0	9·6	0	0·62	.....	.....	.....	19·5	0	3·8	4·4	7·6	23·6	1·50	17·5	.....	2·7	13
2·9	2·0	1·0	.....	0·14	.....	.....	0·05	14·7	0	0·80	.....	.....	.....	19·4	0	5·4	4·4	6·9	22·7	1·48	19·9 (14·5)	.....	2·6	14
2·4	2·5	1·0	.....	0·16	.....	.....	0	7·2	0	0·71	.....	.....	.....	17·8	0	4·6	4·4	6·2	20·8	1·83	24·4 (19·7)	.....	2·8	15
1·6	1·5	1·0	.....	0·18	.....	.....	0·04	8·1	1·5	1·3	.....	.....	.....	16·1	0	6·4	4·4	13·0	26·2	4·88	14·9 (10·7)	.....	2·6	16
2·5	2·6		.....	0·14	.....	.....	.....	9·3	0	1·3	.....	.....	.....	15·5	0	3·9	3·9	9·3	22·0	1·92	20·2	.....	2·8	17

* Alkalis calculated as Na.

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
																			STATION No. 89: MATTAWA
1	Aug. 8/47.....	2075	319	.....	.....	76·1	(7·0)	(4·0)	7·2 (7·0)	34 (50)	(<7)	.....	.....	50·82	44·1	0·0600	.....	15·5	4·8
																			STATION No. 89A: TROUT LAKE
2	Feb. 9/48.....	1820	8	.....	.....	37	.....	.....	6·7	25	2·9	.....	.....	55·88	43·6	0·0593	.....	13·4	5·5
3	Aug. 9.....	2291	52	.....	.....	.....	.....	.....	7·0	10	5·7	2·0	0·6	49·61	44·8	0·0610	.....	15·0	4·8
																			STATION No. 90: BIG JOCKO RIVER
4	Aug. 11/47.....	2113	333	.....	.....	70·3	(8·6)	(3·0)	7·9 (7·7)	72 (80)	(<7)	.....	.....	88·77	72·4	0·0986	.....	19·6	12·8
																			STATION No. 91: LAKE
5	Aug. 30/47.....	2090	305	.....	.....	72·1	(7·2)	(2·5)	7·6 (7·3)	10 (20)	Clear	.....	.....	73·59	52·0	0·0708	.....	10·6	6·8
																			STATION No. 92 MONTREAL
6	Aug. 29/47.....	2084	302	845	1,060	72·0	(7·2)	(2·0)	7·8 (7·6)	38 (58)	(<7)	.....	.....	71·28	58·6	0·0798	133·5	11·8	9·6
																			STATION No. 93: LAKE
7	Aug. 29/47.....	2093	306	.....	.....	72·0	.....	(1·5)	7·9 (8·3)	24 (30)	(Rel. clear)	.....	.....	120·56	75·8	0·1031	.....	10·4	17·2
																			STATION No. 94: BLANCHE RIVER
8	Aug. 12/47.....	2065	314	.....	.....	80·1	(7·4)	(1·0)	8·0 (8·3)	37 (125)	..... (25·0)	.....	.....	125·84	91·4	0·1243	.....	21·6	17·5
																			STATION No. 95: LARDER
9	Aug. 27/47.....	2119	320	.....	.....	64·4	.....	(1·0)	8·7 (8·3)	11 (60)	..... (10·0)	.....	.....	133·21	85·4	0·1161	.....	11·6	16·6

TABLE IX—Continued

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
RIVER AT MOUTH																								
2·0	2·5*	.....	0·08	.....	.....	.....	9·8	0	1·7	.....	.....	.....	17·1 (17·1)	0 (0)	.....	6·6	6·2	20·2	2·40	21·2	.....	2·3	1
NEAR NORTH BAY, ONT.																								
3·1	3·0	1·5	.....	Tr.	.....	.....	0·05	12·0	0	1·3	.....	.....	.....	23·0	0	5·8	5·2	7·7	26·5	1·77	24·2 (18·7)	.....	2·6	2
2·2	2·0	2·0	.....	0·07	0·02	.....	.....	10·2	0	0·40	0	.....	.....	14·6	0	8·5	3·8	9·1	21·1	2·18	24·1 (15·5)	.....	2·6	3
AT HIGHWAY No. 63 BRIDGE																								
2·5	3·4*	.....	0·17	.....	.....	.....	8·5	0	3·5	.....	.....	.....	49·3 (46·4)	0 (0)	4·6	6·6	1·9	42·3	5·12	14·9	.....	0·7	4
TIMAGAMI AT TIMAGAMI, ONT.																								
2·7	3·2*	.....	0·06	.....	.....	.....	12·8	0	2·6	.....	.....	.....	23·9 (22·0)	0 (0)	.....	4·6	8·5	28·1	2·52	20·1	.....	1·6	5
RIVER AT LATCHFORD, ONT.																								
1·9	3·8*	.....	0·05	.....	.....	.....	9·2	0 (0)	4·4	.....	.....	.....	32·9 (31·7)	0 (0)	.....	7·2	4·8	31·8	5·05	20·8	.....	1·1	6
SASAGINAGA AT COBALT, ONT.																								
3·4	1·9*	.....	0·02	.....	.....	.....	10·0	0	3·5	.....	.....	.....	58·3 (58·6)	0 (0)	.....	3·2	9·1	56·9 (53·6)	5·06	6·7	.....	0·5	7
NEAR NOTRE DAME DU NORD, QUE.																								
4·9	2·0*	.....	.....	0·08	.....	.....	8·3	0 (0)	0·6	.....	.....	.....	65·9 (75·6)	0 (0)	.....	7·6	9·9	63·9	3·57	6·3	.....	0·4	8
LAKE AT LARDER LAKE, ONT.																								
4·3	3·1*	.....	.....	0·03	.....	.....	13·9	0·6	3·1	.....	.....	.....	45·9 (53·7)	6·2 (0)	2·2	3·1	11·1	59·1	3·86	10·2	0·23	.....	9

* Alkalis calculated as Na.

TABLE IX—Concluded

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Concluded

(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 K x 10^6 at 25°C.	Residue on Evaporation (Dissolved solids): P.P.M.	Residue on Evaporation (Dissolved solids): Tons per acre-foot	Residue on Evaporation (Dissolved solids): Tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 96: LAC																			
1	Aug. 15/47.....	3159	654	.....	.....	72·7	(7·7)	(101·0)	3·2 (3·2)	7 (30)	(Ab.7)	.....	.....	811·4	431·3	0·5867	.....	.....	42·7
** Lake contaminated with mine waste.																			
STATION No. 97: LAKE DUFAULT																			
2	Aug. 15/47.....	2089	320	.....	.....	71·1	.....	(2·0)	7·0 (6·9)	11 (40)	(<7)	.....	.....	107·47	73·2	0·0995	.....	10·2	9·2
STATION No. 98: KINOJEVIS																			
3	Aug. 16/47.....	2116	331	.....	.....	71·6	(7·4)	(5·0)	9·3 (7·2)	31 (120)	..... (34·0)	.....	.....	87·01	81·6	0·1110	.....	14·0	11·2
STATION No. 99: KINOJEVIS																			
4	Aug. 23/47.....	2067	303	.....	.....	72·5	(6·9)	(3·0)	7·6 (7·4)	45 (170)	..... (26·0)	.....	.....	70·62	74·4	0·1012	.....	25·0	9·5
STATION No. 100: KEWAGAMA																			
5	Aug. 18/47.....	2100	292	.....	.....	73·4	(7·6)	(2·0)	7·5 (7·4)	45 (115)	..... (35·0)	.....	.....	51·70	63·2	0·0860	.....	22·4	6·0
STATION No. 101: LAC THIBEAULT																			
6	July 10/47.....	2059	343	.....	.....	68·0	.....	(2·2)	6·8 (6·7)	30 (35)	Clear	.....	.....	35·75	29·4	0·0400	.....	12·8	5·0

TABLE IX—Concluded

Chemical Analyses of Raw Surface Waters in Ottawa River Watershed—Concluded

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Manganese (Mn)	Iron (Fe): Total	Iron (Fe): Dissolved	Aluminium (Al)	Nitrite (NO_2)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Phosphate (PO_4)	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	Ca/Mg ratio	Per cent sodium	Saturation index: +	Saturation index: −	No.
TREMOY** AT ROUYN, QUE.																								
15·0	18·2	3·1	Cu 1·4	.....	8·2	Zn 1·2	Pb 0·2	281·9	17·6	Tr.	.....	.....	.....	Mineral acidity 35·5	Total acidity 64·4	13·0	10·0	17·9	179·0	2·85	18·7	.....	6·6	1
NEAR NORANDA, QUE.																								
2·6	3·8*	.....	.....	0·20	.....	.....		34·1	0	2·6	.....	.....	.....	5·4 (8·5)	0 (0)	.....	5·2	29·3	33·7 (32·9)	3·54	19·8	.....	2·7	2
RIVER NEAR ROUYN, QUE.																								
2·2	1·4*	.....	.....	0·46	.....	.....		14·1	0 (0)	0·8	.....	.....	.....	15·4 (26·8)	7·2 (0)	13·8	12·5	12·4	37·0	5·10	7·4	0·39	.....	3
RIVER NEAR PREISSAC, QUE.																								
2·5	1·6*	.....	.....	0·64	.....	.....		9·8	0 (0)	1·7	.....	.....	.....	31·7 (22·0)	0 (0)	.....	8·6	8·1	34·1	3·80	9·5	.....	1·4	4
LAKE NEAR CADILLAC, QUE.																								
2·1	3·5*	.....	.....	0·94	.....	.....		7·2	0 (0)	2·2	.....	.....	.....	26·8 (18·3)	0 (0)	.....	7·4	1·6	23·6	2·86	24·5	.....	1·7	5
NEAR MONT LAURIER, QUE.																								
2·4	1·8*	.....	.....	0	.....	.....		5·9	0 (0)	1·7	.....	.....	.....	9·8 (14·6)	0 (0)	.....	6·4	14·3	22·3	2·08	14·9	.....	2·9	6

* Alkalis calculated as Na.

PART III

QUALITY OF MUNICIPAL WATER SUPPLIES IN THE OTTAWA RIVER DRAINAGE BASIN, 1947-48

Civic water supplies were studied in most cases by visiting municipalities during the summer of 1947. Whenever possible, a plant was visited by the writer and the requisite information was obtained directly from the water-works superintendent or other official, but in a few cases it was impossible, within the time available, to see the official concerned and the data reported were either obtained later by questionnaire or copied from other sources. Acknowledgment is made to the publishers of "Water and Sewage"[1] for the use of some of their figures on water consumption and plant facilities.

Many of the communities within this watershed use raw river water untreated or only chlorinated. In some cases, samples of the raw water supply were already being received monthly from the locality or nearby in connection with the surface water study (Part II) and the analysis of any sample received from these stations at about the time of the plant visit is reported as the civic supply. No field test values, therefore, were obtained in regard to these samples. Chlorination of raw waters has been found to affect chemical quality, in so far as routine chemical analysis shows, to a very slight degree, the most noticeable effect being a reduction in colour with certain waters.

Only a few of the municipalities in this basin have their own facilities for chemical testing of raw and finished water. Officials of these municipalities kindly supplied some of these records which have been included below.

In Table XII the chemical analyses, in parts per million, of the raw and finished water supply for each locality are given together with the field results, if any, in brackets, and with occasional comment on the water or analysis.

The data on the various supplies are listed below under each of the municipalities, which are arranged alphabetically as to place and province, in the following order: population; survey date; ownership; source of supply; flow sheet of plant and treatment; storage capacity; daily water consumption; industrial use. Additional data on plant operation and plant problems were often obtained but have not been included in this report. Population figures are, wherever possible, those given to the writer as of the date of the survey; if otherwise, the date is given in parenthesis after the population figure. There was often marked disagreement between information from municipal officials and data published elsewhere regarding such facts as population, consumption, and storage capacity. In these cases the information believed to be most accurate was used. As the survey is at present primarily concerned with determining water quality, special efforts at this time to obtain accurate up-to-date information were not justified. This is particularly true of average daily consumption; in many of the smaller communities no record of consumption is kept and an estimate must be made from the pump ratings and duration of pumping. The consumption varies so widely with the season of the year, industrial use, etc., that it is often difficult to arrive at a representative average figure. Per capita consumption figures normally supplied often mean little, as in some areas a large percentage of the pumpage is used by industry.

Accordingly, no special effort was made to determine the exact extent of industrial use in each municipality, since it is hoped at some future date to make a separate study of each major industry's problems and demands for water. Whenever possible some information was obtained from civic officials regarding the major industrial users in the locality and their consumption and water problems, but no visits were made to the industries themselves except in a few special cases. In the larger communities such as Montreal and Ottawa there are so many varied industrial users that no listing of the industries was attempted.

The limitations regarding analytical methods and interpretation of results therefrom as outlined above and in Water Survey Report No. 1 pertain to this study also.

DISCUSSION

The results on civic supplies, pages 78-139, indicate the extent to which Ottawa River and its tributaries are used by the various municipalities lying within this drainage basin. Most of the localities have available plenty of water requiring little treatment, although it is apparent that in many locations additional treatment would be desirable or would be required in order to make the waters suitable for certain uses.

High colour appears to be the greatest disadvantage in this watershed. A major problem in many localities is presented by the need for additional plant facilities for producing and distributing desirable water. Before the last war, many localities were not in a financial position to remodel plant equipment, piping, etc., and when the war brought about great shifts in population as well as a major increase in industrialization, these changes put

[1] Water and Sewage, now Municipal Utilities—published by the Monetary Times Printing Co. of Canada, Ltd., 341 Church St., Toronto 2, Ontario.

terrific strain on many water-works plants. Since the war, the high cost of labour and materials, and, for some time, the lack of materials have restricted the necessary repairs, expansion, and renovation of water production facilities, with the result that in this area, as in many others across Canada, a large number of plants are now running at over-capacity or are of necessity using treatment methods that are definitely out of date. During the last few years these problems have been vigorously attacked and it is almost impossible for any report of this nature to be quite up to date regarding plant facilities, treatment methods, population, etc. When known, remarks are made concerning changes made or planned since the survey was begun.

Table X summarizes the use of waters in relation to population in this watershed. In presenting this table it is emphasized that during the past few years population has been shifting so rapidly that it is most difficult to arrive at definite figures. This is very apparent from the figures given in the list of municipalities. The 1941 census figures are the latest available, and because of war conditions at that time there was a great shift in population to industrial areas such as Montreal. Total populations in an area such as that drained by a watershed are not normally determined, so the values here used are only an estimate based on the 1941 census in so far as it applies. The changing of electoral districts in 1947 has further complicated the determination of populations.

It will be noted that on the basis of the 1941 census about 79 per cent of the population is served with civic supplies, and slightly over 3·0 per cent by ground water. Of course, those not served by systems generally use ground water from their own wells or springs.

In studying this drainage basin it is seen that the Montreal system supplies so many municipalities and such a large percentage of the population that it influences the data enormously. When the Montreal system is omitted from the data, as given in Table X, the percentage use of ground water is considerably higher at about 12 per cent based on the 1941 census. It is evident that only the smaller communities are using ground waters; although 32 per cent of the total number of localities use ground-water sources or a mixed supply, this percentage represents only about 3·5 per cent of the total population served.

Table XI outlines the hardness characteristics of the different supplies in the watershed. Most of the supplies are surface waters that are generally soft to medium-hard in character. It will be noted that only eleven ground waters or mixed waters are hard water, that is, have a hardness greater than 120 p.p.m. as $CaCO_3$. Over 77 per cent of the supplies are normally soft waters. The high percentage of soft ground waters is very marked. However, these are in many cases springs in nearby mountains, and not deep wells.

Conditions represented by the data in Table XI will change, of course, with seasonal variation in the streams, since so many supplies are untreated surface water. Thus, at times the supplies may be harder than is shown, as most of the results herein are based on summer samples. Part II covering surface waters in the area shows the extremes to be expected in these supplies. Variation in certain mixed supplies, such as those at Rigaud, Quebec, will depend upon the percentage mixture of the waters.

Of the forty-seven civic supplies in this area using surface waters, seven are untreated except by coarse screening, sixteen are chlorinated only, and the remaining twenty-four have other treatment besides chlorination, that is, about 50 per cent of the surface waters are used with no treatment to remove colour or other constituents (Table X).

Ground waters are normally used without treatment, only two of the twenty-four supplies from this source being chlorinated. These waters are not particularly hard when compared with ground waters elsewhere, and in fact most are quite low in hardness (Table XI). There is in this watershed usually plenty of ground water although much of it, especially in the southern section, may be sulphur-bearing, and a few sources may be high in salts. More details regarding ground waters in this area appear in the reports of the Ground Water and Borings Section, (now Pleistocene and Engineering Geology Division), Geological Survey of Canada.

It is apparent from the infrequency of treatment and from the large number of surface water users not even chlorinating, that this river basin is as yet not polluted by industrial waste or domestic sewage to such extent as to raise serious problems in treatment. It is noticeable, however, that as communities grow, and as one proceeds down river, more treatment is used. Although many users do not treat the surface water this does not necessarily mean that the water is satisfactory. In all cases removal of colour would be required for many industrial uses and is preferable for domestic consumption. Such treatment in this watershed is more costly than in many others because the waters have such a low alkalinity that flocculation by aluminium sulphate (filter alum) lowers the pH of the water to a point where the water becomes corrosive to piping and fittings. It is then necessary to add lime to bring the pH back to neutral or slightly alkaline in accordance with the Langelier saturation index.

The "chlorine demand," or the amount of chlorine necessary to maintain the desired residual free chlorine content of 0·2 to 0·3 p.p.m., is also affected by the type of water found in this watershed and varies widely depending upon the algae content of the water and the colour. The latter often causes a relatively high chlorine demand since colour is often reduced considerably by chlorination. In some localities, because of local conditions, wind direction, or floods, there is considerable turbidity that necessitates sand-filtering. Taste and odour problems in this watershed are fortunately not so common as in many other areas, probably owing to the fact that the streams are usually fast flowing from wooded areas and pollution is negligible.

TABLE X

Municipal Supplies Within Ottawa River Drainage Basin

Summary of Data on Source, Treatment, and Population Served During 1941 and 1947

Area	Number of municipalities served	Number of water systems	Source of supply				Methods of treatment				Population in thousands				
			Ground waters	Surface waters	Mixed waters	Percentage of ground waters	None	Chlorination			Total in whole watershed, 1941 census	Served by water systems	Served with ground waters**	Percentage of total population served by water systems	Percentage of population served using ground waters
								Alone	With additional treatment	Percentage with additional treatment					
Ontario	27	22	5	16	1	27·3	6	7	9	40·9	440,850	293·5 ('47) 257·4 ('41)	10·6 ('47) 9·4 ('41)	57·6 ('41)	3·6 ('47) 3·7 ('41)
Quebec	75	53	19	31	3	41·6	25	12	16	30·2	1,481,050	1,549·3 ('47) 1,266·9 ('41)	50·4 ('47) 41·0 ('41)	..... 85·1 ('41)	3·6 ('47) 3·2 ('41)
Total watershed	102	75	24	47	4	32·0	31	19	25	33·3	1,927,900	1,842·8 (47) 1,525·3 ('41)	67·0 ('47) 50·6 ('41)	..... 79·1 ('41)	3·6 ('47) 3·3 ('41)
Quebec less Montreal supply*	57	52	19	30	3	42·3	25	12	15	28·9	.....	229·2 ('47) 189·4 ('41)	50·4 ('47) 41·0 ('41)	....	24·6 ('47) 21·6 ('41)
Total watershed excluding Montreal supply*	84	74	24	46	4	37·8	31	19	24	32·5	.....	522·6 ('47) 446·8 ('41)	67·0 ('47) 50·6 ('41)	....	12·9 ('47) 11·6 ('41)

* All communities that are served from the city of Montreal filtration plant are excluded.
** Includes mixed supplies.

TABLE XI

Hardness of Municipal Supplies, Ottawa River Drainage Basin

Area	Number of municipalities served	Number of systems	Ground waters					Surface waters					Mixed waters					Percentage of systems				Percentage of population surveyed using water of certain degrees of hardness			
			No.	Soft	Medium	Hard	Very hard	No.	Soft	Medium	Hard	Very hard	No.	Soft	Medium	Hard	Very hard	Soft	Medium	Hard	Very hard	Soft	Medium	Hard	Very hard
Ontario	27	22	5	1	0	1	3	16	13	3	0	0	1	1	0	0	0	68·2	13·6	4·5	13·7	91·4	5·6	0·4	2·7
Quebec	75	53	19	13	1	0	5	31	30	1	0	0	3	0	1	0	2	81·1	5·7	0	13·2	13·4	85·8	0	0·8
Total watershed	102	75	24	14	1	1	8	47	43	4	0	0	4	1	1	0	2	77·4	8·0	1·3	13·3	25·8	72·8	0·1	1·3

Soft water: 1 to 60 p.p.m. total hardness as $CaCO_3$
Medium hard water: 61 to 120 " " " "
Hard water: 121 to 180 " " " "
Very hard water: 181 and greater " " "

DESCRIPTION OF MUNICIPAL WATER SUPPLIES

ONTARIO

Almonte

Population: 2,356 (1947).
2,700 (1949).

Date of Survey: September 26, 1947, and June 16, 1949.
Ownership: Municipally owned, and operated by a public utilities commission.
Source of Supply: Three deep wells. In 1947, two deep wells 111 feet in rock. The new well, No. 3, and old well, No. 1, are generally used. Wells No. 1 and No. 2 are said to pump from the same water-table.
Treatment: No treatment. Well water is pumped direct to reservoir and distribution system.
Storage Capacity: One standpipe, 35,000 gallons.
Consumption: Estimated at 0·21 m.g.d. (1947); 0·30 to 0·34 m.g.d. (1949).
Industrial Use: The main industries are Rosamund Textile Co., Thoburn Textile Co., and Midland Woollen Co., who all use Mississippi River water for most processing.

Arnprior

Population: 4,235.
Date of Survey: September 15, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Madawaska River just above the town.
Treatment: Madawaska River enters, by gravity, a sump well in which the water is chlorinated to give a residual of 0·2 to 0·3 p.p.m., about 30 lbs. chlorine per day being used. The water is then pumped downward through three sand-filled pressure-filters and into the elevated storage tank and the distribution system. Filters are washed daily and alum is used only rarely, in the spring and then as alum solution.
Storage Capacity: One elevated tank, 96,700 gallons.
Consumption: 0·8 to 1·0 m.g.d.; average about 0·9 m.g.d. Industrial use by two textile manufacturers and Canadian Pacific Railway is estimated at about 215,000 g.p.d.
Industrial Use: Larger users are: Kenwood Mills, manufacturers of felts, blankets, etc.; Millstock Co., producing similar products; The Canadian Public Booth Co.; a lumber company; The Canadian Pacific Railway; and an airport. No industries do further treatment of water supplied for general use.

Bourget

Population: 600 to 700.
Date of Survey: June 15, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Spring water.
Treatment: Water flows by gravity to distribution system. No treatment.
Storage Capacity: No data.
Consumption: No data.
Industrial Use: No major industrial user.

Carleton Place

Population: 4,500.
Date of Survey: September 26, 1947.
Ownership: Municipally owned, and operated by a public utilities commission.
Source of Supply: Mississippi River, just above the town.
Treatment: Water enters sump well by gravity from 300 feet out in centre of river. Chlorine added to sump well at rate of 35 lbs. per day (m.g.) in summer; 12 lbs. per day (m.g.) in winter; increased chlorine demand due to algae that at times cause taste. Water is then pumped to standpipe and distribution system.
Storage Capacity: One elevated tank, 108,000 gallons.
Consumption: Average: 1 m.g.d.
Industrial Use: Main users of civic water are Renfrew Textiles, about 63,000 g.p.d.; Canadian Pacific Railway, 65,000 g.p.d.; Findlay Stove Co., 27,500 g.p.d. Bates & Innes Co. uses water direct from the river, partly softened through zeolite.

ONTARIO—Continued

Cobalt

Population: 2,000.
Date of Survey: August 29, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Lake Sasaginaga, a small lake ¾ mile from town. Plant is on shore of lake with two intakes into lake.
Treatment: Water is pumped to a small reservoir and thence to the distribution system; Chlorination at the pump at rate of 8·5 lbs. per 24 hrs., i.e., 11 lbs./m.g. based on average daily consumption.
Storage Capacity: One elevated tank on distant hill.
Consumption: 0·75 to 0·80 m.g.d.
Industrial Use: No major industrial users. Timiskaming Testing Laboratories use this water.

Deep River

Population: 1,000, increasing rapidly.
Date of Survey: August 7, 1947.
Ownership: Owned and operated by Dominion Government.
Source of Supply: Ottawa River, just above town.
Treatment: River water enters sump well by gravity 120 feet out in river at 11-foot depth. After chlorination at sump well, water is pumped to reservoir and thence to distribution system. Chlorination to residual of 0·1 to 0·2 p.p.m. System is automatic in that water height in reservoir controls pumping with chlorination. Pressure varies from 50 to 80 p.s.i. in system.
Storage Capacity: One elevated tank.
Consumption: About 0·18 m.g.d.
Industrial Use: None, except heating plant for public buildings using 4,000 to 5,000 g.p.d. Water is reported satisfactory as boiler feed (125 p.s.i.) when internal treatment is used.

Eastview

Population: 9,500.
Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Purchased from city of Ottawa (treated Ottawa River water).
Treatment: *See* Ottawa, Ont.
Storage Capacity: None.
Consumption: No data.
Industrial Use: Several small industries.

Englehart

Population: 1,350.
Date of Survey: August 28, 1947.
Ownership: Municipally owned, and operated by a public utilities commission.
Source of Supply: Two deep wells near Ontario Northland Railway; one well drilled in 1914, the other drilled in 1937.
Treatment: Well water is pumped directly to reservoir and distribution mains without any treatment.
Storage Capacity: Two tanks, 378,000 gallons total capacity.
Consumption: Average: 145,500 g.p.d.
Industrial Use: Main users are: Ontario Northland Railway shops using 67,500 to 100,000 g.p.d.; a packing plant using 4,000 g.p.d.; and a creamery using 2,000 g.p.d.

ONTARIO—Continued

Ferris West Township

Population: 1,150.
(Summer population: 3,560).
Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Purchased from city of North Bay (treated Trout Lake water).
Treatment: *See* North Bay, Ont.
Storage Capacity: None.
Consumption: Average: 62,540 g.p.d.
Industrial Use: No major industries. Tourist camps, etc.

Haileybury

Population: 1,982.
Date of Survey: August 29, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Lake Timiskaming nearby. About 150 people living on nearby hill use Constance Lake water with no treatment.
Treatment: Plant built in 1911. Water is pumped from the lake through a 125-foot intake; alum is added at rate of 67 lbs. a day (180 lbs./m.g.); chlorination at rate of 10 lbs. a day; water is pumped downward through pressure filters (Bell's Patent filters)—five filters but only four in use with water backwash once every 24 hours. Filtered water is then pumped to reservoir and mains. During spring run-off, soda ash may be added with the alum. Pressure on filters 120 p.s.i. Control on treatment by determination of pH and residual chlorine.
Storage Capacity: One elevated tank, 195,000 gallons.
Consumption: Average: 0·375 to 0·40 m.g.d.
Industrial Use: No major industry. Sanitarium is the greatest user.

Hawkesbury

Population: 7,500 (1947).
Date of Survey: July 8, 1947; June 9, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Ottawa River nearby.
Treatment: Water enters by gravity a sump well at plant on island in river from 100 to 200 feet out in fast water. Water is screened at the intake and alum dry-fed at sump well at rate of 200 to 300 lbs. a day. Water then enters mixing chamber and covered, baffled, coagulating basins. One basin is cleaned every month or two months. Water then flows by gravity to four small rapid sand filters and then, with chlorination at rate of 9 to 9·5 lbs. a day (13·5 lbs./m.g.) to give chlorine residual of 0·1 to 0·2 p.p.m., is pumped to standpipe and mains. Filters are backwashed daily with a 5-minute water wash, followed at times by an air wash.
Storage Capacity: One tank, 79,000 gallons.
Consumption: Average: 1·1 m.g.d. (1947); 1·175 m.g.d. (1949).
Industrial Use: Major industry of town is that of Canadian International Paper Co. This plant has its own water-treatment plant and system, using Ottawa River water.

Kemptville

Population: 1,600.
Date of Survey: July 13, 1950.
Ownership: Municipally owned and operated.
Source of Supply: Two rock wells, one 190 feet and the other 205 feet deep.
Treatment: No treatment. Water is pumped from each well to a reservoir, and then repumped to the system.
Storage Capacity: Two reservoirs; 33,000 and 225,000 gallons.
Consumption: No data, as the system is in process of being built.
Industrial Use: Main users are: Kemptville Agricultural School; Borden's Creamery (also has own well); Dominion Concrete Co.

93295—6

Kirkland Lake

Population: 21,000, exclusive of outlying mines.
Date of Survey: August 28, 1947.
Ownership: Municipally owned and operated.
Source of Supply: McTavish, Victoria, and Gull Lakes.
Treatment: Water is pumped direct from Gull Lake with no treatment other than chlorination to give residual of 0·2 to 0·3 p.p.m. Chlorine demand changes due to algae; in winter demand may be down to 17 to 18 lbs./m.g., whereas yearly average is 26 lbs./m.g.
Storage Capacity: Gull Lake is used as a reservoir into which the other lakes are fed.
Consumption: Average: 4·5 to 6·0 m.g.d., including mines.
Industrial Use: Seven major mines, and a refrigeration plant.

Mine consumption in 1936:	m.g.d.
Lake Shore Gold Mines Ltd.	3·6
Wright-Hargreaves, Ltd.	1·5
Teck-Hughes	0·63
Sylvanite	0·34
Kirkland Lake Gold Mines Ltd.	0·25
Macassa	—
Toburn	—

Use of water is as follows:

Average consumption, m.g.d.

——	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
Mines	3·1	2·96	3·02	3·09	2·83	2·55	2·0	1·6	1·45	1·45	1·5	Probably same as 1946
Town	2·1	2·3	2·1	2·2	2·6	2·7	2·4	2·4	2·4	2·65	2·7	
Total	5·2	5·26	5·12	5·29	5·43	5·25	4·4	4·0	3·85	4·10	4·2	

Larder Lake

Population: 2,200 (1947).
Date of Survey: August 27, 1947; November 30, 1949.
Ownership: Municipally owned and operated.
Source of Supply: In 1947, Larder Lake nearby. Due to contamination increasing in Larder Lake from sewerage and mine wastes from nearby mining properties, plans were under way to change the source of supply to an 80-foot deep well to pump 300 to 700 gallons a minute. This well supply was put into use in 1948.
Treatment: In 1947, water was pumped directly from lake into mains with chlorination at a rate of 66 gallons a month of a sodium hypochlorite solution to give a residual of 0·2 p.p.m. In 1948, when well water was used, no treatment was carried out.
Storage Capacity: None. A reservoir was under construction in 1950.
Consumption: No record.
Industrial Use: No major industrial user. Main industries in town are saw- and planing-mill; gold mining nearby.

ONTARIO—Continued

Nepean Township

Population: 9,300 (1947).
9,700 (1948).

Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from city of Ottawa. In 1949 a large part of the township was annexed by the city of Ottawa, including the area served by this system.
Treatment: *See* Ottawa, Ontario.
Storage Capacity: None.
Consumption: Average: 264,700 g.p.d. (1947); 312,000 g.p.d. (1948).
Industrial Use: Several small industries.

New Liskeard

Population: 3,800.
Date of Survey: August 13, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Three deep wells on shore of Lake Timiskaming near mouth of Wabi Creek. Two wells only being used, depth 100 to 120 feet.
Treatment: No chemical treatment. Water is pumped direct into standpipe on hill, ground reservoir at plant and into mains.
Storage Capacity: One standpipe, 150,000 gallons; ground reservoir at plant.
Consumption: Average: 1 m.g.d.
Industrial Use: Major industries are Wabi Iron Works and Hill-Clarke-Francis Lumber Co. The latter has its own supply for cooling purposes.

North Bay

Population: 17,500.
Date of Survey: August 9, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Trout Lake, $2\frac{1}{2}$ miles distant.
Treatment: Water enters by gravity into sump well at plant on lake shore from intakes 440 feet in lake from 28-foot depth. Chlorine is added to well at rate of 30 lbs. a day to give residual of 0·1 p.p.m. Water is pumped from sump well to mains and/or reservoir.
Storage Capacity: One open reservoir on nearby hill, 4·4 m.g.
Consumption: 2·0 to 2·5 m.g.d.
Industrial Use: A railway terminus; water is supplied to Canadian Pacific Railway and Ontario Northland Railway shops and to Canadian National Railways. Several smaller industries, sawmills, etc. West Ferris township is also supplied with this water.

Ottawa

Population: 163,350 (1947).
Date of Survey: January 29, 1947; June 2, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Ottawa River, above Chaudière Falls at Lemieux Island, 2 miles upstream from business section.
Treatment: In 1947, water enters open settling basin from river, then flows by gravity through screens to sump well. Basin is treated twice weekly at certain seasons with $CuSO_4$ (8 lbs.). Alum, added by dry feeder at sump well at rate of 2·25 to 2·75 g.p.g., using iron-free alum. Activated carbon is also added here during the summer (June 1 to September 1) at rate of 7·6 lbs. a day (0·25 g.p.g.). Water then flows to baffled mixing and coagulating basins (40 min.) and then to settling basins (3 hrs.). Then, water flows by gravity to twelve rapid sand filters (27 by 54 feet) using water backwash; these give 48 to 120 hours' filter run.

93295—6½

ONTARIO—Continued

Ottawa—Concluded

Backwash 3½ mins. per filter. Then water goes to clear well from which it is pumped to distribution system. Lime is added 100 to 200 feet ahead of the main pumps at rate of 1 g.p.g. to give pH of 8·4 to 8·6. Chlorine added here to give final residual of 0·05 to 1 p.p.m.
In 1949, prechlorination being used at rate of 1·7 p.p.m., which allows use of less alum (1·5 to 1·75 g.p.g.), since colour is partly bleached. Four banks of eight coagulating basins, two settling tanks, and sixteen filters now in use with longer filter runs since prechlorination. Palmer agitators on some filters. Post-chlorination to final residual of 0·1 to 0·15 p.p.m.

Storage Capacity: 6 m.g. clear well. Construction of elevated tank being considered.
Consumption: Average: 22·5 m.g.d. (1947); 23 to 25 m.g.d. (1948-1949).
Industrial Use: Various industrial users, but no one major industrial user.
Remarks: This plant in 1949 used a continuous residual chlorine test apparatus using phenyl arsine. The plant will no doubt have to be enlarged to provide for extended growth of the city due to annexation of outlying districts, that is, part of Nepean and Gloucester townships.
This plant has a laboratory with continuous control on certain values. A summary of monthly records obtained from the plant over a period of time is included in Table XII.

Pembroke

Population: 12,500.
Date of Survey: August 6, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Ottawa River, here called Allumette Lake.
Treatment: Water enters plant by gravity from some distance out in the river or lake from a depth of 60 feet. Chlorine is added at the sump well to give a residual of 0·1 to 0·2 p.p.m. Water is then pumped direct to standpipe and system with no further treatment.
Storage Capacity: One elevated tank, 140,000 gallons.
Consumption: Average: 1 m.g.d.
Industrial Use: The main industries using this water are lumbering, manufacturing of matches and boxes, and the Canadian Pacific Railway.

Perth

Population: 4,500.
Date of Survey: September 25, 1947.
Ownership: Municipally owned, and operated by a public utilities commission.
Source of Supply: Tay River, ½ mile distant.
Treatment: Raw water enters by gravity from the middle of Tay River near plant at two circular sump wells. Alum, fed in summer at wells as a solution, added at rate of 1·4 g.p.g. Carbon also added here at rate of 10 lbs. a day. Chlorine added to sump well to give residual of 0·2 to 0·4 p.p.m., average 26 lbs. a day in spring may reach 33 lbs. a day (2·7 p.p.m.) because of higher colour in water. Treated water is pumped through two horizontal, sand-filled pressure-filters direct to standpipe and mains at rate of 700 to 750 gallons a minute. When reservoir is full, pumps are shut off, usually at 3-hour intervals. Filters backwashed every 3 hours.
Storage Capacity: One standpipe, 208,000 gallons.
Consumption: Approximately 0·6 m.g.d.
Industrial Use: It is estimated that the main industries use 50 per cent of the total pumpage. The main industries are: Tayside Textiles; H. K. Wampole Co., Ltd. (pharmaceuticals); Andrew Jergens Co., Ltd.; Perth Shoe Co.; Esmond Mills; and two felt manufacturers. The Wampole Co., Ltd. also zeolite-soften the water for certain uses.

Plantagenet

Population: 900 to 1,000.
Date of Survey: June 15, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Surface drainage (100 acres) and springs in hills, 1 mile distant.
Treatment: No treatment other than natural filtration through sand and tile on clay to open reservoir. Water then flows by gravity to system.
Storage Capacity: Open concrete reservoir in hills, 45,000 gallons.
Consumption: No record; estimated at 60,000 g.p.d.
Industrial Use: No major industries. For fire protection South Nation River water is used.

Renfrew

Population: 6,000 approximately.
Date of Survey: September 16, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Bonnechère River, near plant in town.
Treatment: Plant built in 1897 and moved to present location in 1917. Water from river flows $\frac{1}{4}$ mile through cement and cast iron pipe and is pumped from pipe through four small vertical and two horizontal pressure-filters using sand. (The four vertical filters are equal to one horizontal). Capacity of filters 1,100 to 1,600 g.p.m. Filters backwashed normally once every 24 hours, but if the river is turbid it is necessary to backwash every 2 or 3 hours. Chlorination at pumps at rate of 17·5 lbs./m.g. to give residual of 0·2 to 0·3 p.p.m. In the spring and in September, algae in raw water raise chlorine demand to 27 lbs./m.g. During turbid water periods alum is added at intake pumps at usual rate of 10 to 15 lbs./hr. but may require 42 lbs./hr. (1,000 lbs./day).
Storage Capacity: One standpipe, 300,000 gallons.
Consumption: 0·6 to 1·25 m.g.d.
Industrial Use: Main industrial uses are manufacture of textiles and machinery.
Remarks: At time of survey, consideration was being given to installation of sedimentation basins and enlargement of plant, which is now running at over-capacity.

Rockcliffe Park

Population: 1,400 to 1,500.
Date of Survey: 1949.
Ownership: Municipally owned and operated.
Source of Supply: Purchased from the city of Ottawa.
Treatment: *See* Ottawa, Ont.
Storage Capacity: None.
Consumption: Approximately 95,000 g.p.d.
Industrial Use: No major industries. This is primarily a residential suburb.

Rockland

Population: about 2,500.
Date of Survey: June 15, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Ottawa River nearby.
Treatment: Water enters by gravity from river at two intakes (12 feet into river) through screens into sump well. It is then pumped through two small sand-filled pressure-filters in plant on river's edge to reservoir and system. Chlorination at pumps at average rate of 0·4 lb./hr. (9·6 lbs./day), but in spring and when river water is turbid more chlorine is needed. Filters are backwashed from mains once daily, but when water is turbid may be, of necessity, backwashed every 4 hours.
Storage Capacity: 85,000 gallons; and tank, 25,000 gallons.
Consumption: No record; estimated from pumping rate at 0·18 to 0·27 m.g.d.
Industrial Use: No major industries in town, which was previously a lumbering centre (two sawmills).

DESCRIPTION OF MUNICIPAL WATER SUPPLIES—Continued

ONTARIO—Concluded

Smiths Falls

Population: 7,750.
Date of Survey: March 7, 1947 and September 26, 1947.
Ownership: Municipally owned, and operated by a public utilities commission.
Source of Supply: Rideau River nearby.
Treatment: Part of the river water operates a water pump. Raw water is pumped (water and electric pumps) from sump well, which is gravity-filled, into baffled mixing basin where alum is added (dry-fed) at rate of 600 to 900 lbs./m.g. After 30-minute mixing, water flows to settling basins and then by gravity to three small rapid sand filters, then to clear well. Lime is added daily as slurry to clear well at rate of 50 lbs.; water is chlorinated at distribution pumps at rate of 12 lbs./m.g. to give residual of 0·2 p.p.m. When algae are excessive, carbon at rate of 5 lbs./m.g. is added with alum.
Storage Capacity: One standpipe, 210,000 gallons.
Consumption: Average: 1·3 m.g.d. (Canadian Pacific Railway, 0·4 m.g.d.)
On September 26, 1947, 0·944 m.g.d. (Town).
0·997 m.g.d. (Canadian Pacific Railway).
Total, 1·941 m.g.d.
Industrial Use: Canadian Pacific Railway uses this water direct for boilers, etc.; Frost & Wood Co. use about 2 m.g. monthly.

Swastika

Population: 1,000.
(450 with system, remainder using street taps).
Date of Survey: August 27, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Part of supply purchased from Teck township (Kirkland Lake) supply; part from Blanche River nearby.
Treatment: Some water pumped direct from Blanche River, chlorinated and pressure-filtered to system. Chlorination at pumps at rate of 4·0 to 4·5 lbs./day.
(*See* Kirkland Lake, Ont., for details of source, treatment, and analysis of Teck township supply.)
Storage Capacity: None.
Consumption: Approximately 0·34 m.g.d. during June 1947.
Industrial Use: No major industry. Ontario Northland Railway uses own supply from Blanche River.

Teck Township

(*See* Kirkland Lake and Swastika.)

QUEBEC

Abord-à-Plouffe

Population: 1,850 (1947) (Municipality).
3,800 (1949) (Municipality and suburbs).
Date of Survey: February 1950.
Ownership: Municipally owned and operated.
Source of Supply: Rivière des Prairies nearby.
Treatment: Water from river enters sump well and alum is added at rate of about 2·6 g.p.g.; water is then prechlorinated and after settling in basin (100,000-gallon capacity) flows by gravity through rapid sand filters to a clear well. The water is then post-chlorinated and lime is added to control pH, after which the water is pumped to reservoirs and distribution system. Total chlorine additions are at the rate of about 100 lbs./m.g.
Storage Capacity: One raw water reservoir and one filtered-water reservoir.
Consumption: No meters; estimated at 0·2 m.g.d.
Industrial Use: Main industrial users are: Ro-El Furniture Mfg. Co.; Cecil Spinning Co.; Flash Stove Co.; a laundry; and Esquire Luggage.

QUEBEC—Continued

Aylmer

	Population: 3,500.
Date of Survey:	August 4, 1947.
Ownership:	Municipally owned and operated.
Source of Supply:	Lake Deschênes (Ottawa River), above the cities of Ottawa and Hull.
Treatment:	Water enters by gravity from 900 feet out in the river into sump well. Alum, dry-fed at rate of 160 to 180 lbs./24 hrs. and water then low-lifted to two sedimentation tanks, each 14 feet deep and 70,000-gallon capacity. Water then flows by gravity to three 10- by 12-foot, rapid sand filters, then to clear well, and is finally pumped to reservoir and distribution system. Chlorination at clear well at rate of 3 lbs./24 hours. Retention time before filters, 4 hours; filters backwashed usually every 12 hours using air for 2 minutes, water (6,000 gallons per filter) for 5 minutes.
Storage Capacity:	Elevated tank, 50,000 gallons; clear well, 42,000 gallons.
Consumption:	Average: 0·525 m.g.d. (1947).
Industrial Use:	No major industrial use, but one large religious institution uses this supply.

Brownsburg

	Population: 3,100.
Date of Survey:	1947.
Ownership:	Municipally owned and operated.
Source of Supply:	West River, tributary of North River.
Treatment:	None. Water flows by gravity to storage and distribution system. Since survey was made, chlorination of supply was begun.
Storage Capacity:	One reservoir, 200,000 gallons.
Consumption:	About 0·42 m.g.d.
Industrial Use:	Canadian Industries, Ltd. plant uses West River water for various industrial uses, in particular for cooling.

Buckingham

	Population: 4,500.
Date of Survey:	July 11, 1947.
Ownership:	Municipally owned and operated.
Source of Supply:	Rivière du Lièvre nearby.
Treatment:	Water is pumped from river direct to mains, with chlorination to residual of 0·2 to 0·3 p.p.m.
Storage Capacity:	None.
Consumption:	Not known.
Industrial Use:	No major industrial use. Electric Reduction Co. has own intake at river and uses this water for various industrial purposes. Buckingham Water Works plant also supplies Masson, Que.

Cadillac

	Population: 2,000.
Date of Survey:	August 18, 1947.
Ownership:	Municipally owned and operated.
Source of Supply:	Well in 20-foot deep gravel pit near town, drilled about 25 feet.
Treatment:	New plant started early in 1947. Water is pumped into concrete reservoir, then to Cadillac mains and to elevated tank at the O'Brien Mine townsite. No treatment, except chlorination if bacteriological tests indicate the need for it.
Storage Capacity:	One concrete ground reservoir, 200,000 gallons.
Consumption:	75,000 g.p.d.
Industrial Use:	Plant supplies O'Brien Mine townsite and Canadian National Railway, each using about 15,000 to 20,000 g.p.d.

QUEBEC—Continued

Campbell's Bay

Population: 1,100.
Date of Survey: August 5, 1947.
Ownership: Privately owned, and operated by Campbell's Bay Water Co. Fire protection system owned by town.
Source of Supply: Ottawa River nearby.
Treatment: No treatment. Water is pumped direct from river to system.
Storage Capacity: One tank on nearby hill (50,000 gallons) used for fire protection.
Consumption: Approximately 25,000 g.p.d.
Industrial Use: Main industry sawmilling and lumbering.

Como

Population: 1,950, including Hudson and Hudson Heights.
Date of Survey: June 17, 1947.
Ownership: Privately owned and operated.
Source of Supply: Springs in the Rigaud Mountains.
Treatment: Spring water held by reservoirs in hills; thence by gravity to users, with no chlorination or other treatment. Water is pumped from several springs to reservoirs.
Storage Capacity: Two open reservoirs in the hills.
Consumption: Not known (no meters); water is always running to waste.
Industrial Use: No major industries; considerable fluctuation in use by summer cottagers and tourists.

Crabtree Mills

Population: 1,500.
Date of Survey: 1949.
Ownership: Privately owned, and operated by Howard Smith Paper Mills, Ltd.
Source of Supply: Ouareau River nearby.
Treatment: Water is filtered through rapid sand filters and chlorinated at distribution pumps.
Storage Capacity: One concrete reservoir, 25,000 gallons.
Consumption: Average: 0·14 m.g.d.
Industrial Use: Main industry is Howard Smith Paper Mills, Ltd.

Dorion (Vaudreuil)

Population: 1,300.
Date of Survey: June 17, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Springs and wells nearby at St. Lazare, Que.
Treatment: Springs flow to reservoir; deep well pumped to reservoir. Water is then pumped from reservoir to system. No treatment.
Storage Capacity: One reservoir, 66,000 gallons.
Consumption: No record.
Industrial Use: No major industrial users.

Dorval

Population: 3,000.
Date of Survey: June 18, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Lake St. Louis (St. Lawrence River) below mouth of Ottawa River; at times a mixture of river waters.
Treatment: Water enters from 75 feet out in lake by gravity through screens to sump well. Water is then low-lifted to one small mixing basin and thence goes by gravity to two small coagulating basins in the old plant and one large coagulating basin in the new plant. Alum normally added at low-lift pumps at rate of 1·5 to 1·75 g.p.g. Water then flows by gravity to two small and two large (27 by 14 feet) rapid sand filters. The older, small filters using anthrafilt operate at 200 g.p.m., the large filters using sand at 300 g.p.m. Filters are air-backwashed. At clear well, soda ash and chlorine are added—soda ash at rate of 2·2 g.p.g. for every 2·1

QUEBEC—Continued

Dorval—Concluded

g.p.g. alum., and chlorine at 8 lbs./day (0·3 to 0·4 p.p.m.) to give residual of 0·1 p.p.m. Retention time before filters 2⅔ hours. There is considerable laboratory control on operations at this plant.

Storage Capacity: One tank, 80,000 gallons. One underground clear well, 140,000 gallons.
Consumption: 0·6 m.g.d.; plant capacity 1·5 m.g.d.
Industrial Use: A number of small industries.

Fort Coulonge

Population: 1,300.
Date of Survey: August 5, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Coulonge River near town.
Treatment: No treatment. Water is pumped from centre of river direct to reservoir and distribution system.
Storage Capacity: One elevated tank.
Consumption: No record.
Industrial Use: Main industry is lumbering and sawmilling.

Gatineau Mills (Gatineau)

Population: 2,800.
Date of Survey: January 9, 1947; May 23, 1947; December 5, 1947.
Ownership: System municipally owned. Plant operation in mill of Canadian International Paper Co.
Source of Supply: Ottawa River at plant of Canadian International Paper Co., below mouths of Gatineau and Rideau Rivers.
Treatment: New plant just beginning to operate. Ottawa River water is pumped through brass screens. Alum dry-fed to water, then the water goes by gravity to two mixing and coagulating chambers (Dorco hydrotreaters). After retention-time of 3 to 4 hours, settled water passes to six modern rapid sand filters, and then by gravity to two clear wells. From here it is pumped to mains.

Water for civic use is treated with lime, chlorine, and chlorine dioxide prior to distribution. In late 1947, in order to increase flow of water through plant and to speed coagulation in hydrotreaters, silicate was added with alum (10 p.p.m. Baylis silica sol per 2 gr. alum/U.S. gal.). Usual alum treatment about 2·0 to 2·75 g.p.g.; silicate used only at times, at rate of about 5 to 6 g.p.g.

Storage Capacity: Two clear wells, total capacity 2 m.g.
Consumption: Civic use 0·27 m.g.d.
Industrial Use: This plant supplies water (10 to 12 m.g.d.) to the mill of Canadian International Paper Co. The bleach plant uses treated water, and other parts of the plant use untreated water.

Previous to 1947, plant did not use the hydrotreaters; alum solution was added and water allowed to coagulate and settle, pH then being about 5·8. After rapid sand filtration lime was dry-fed to give pH 7·2. Then chlorine and chlorine dioxide were added to give chlorine residual of 0·5 p.p.m.

Gracefield

Population: village 1,700; total parish 3,000.
Date of Survey: July 23, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Gatineau River nearby.
Treatment: Water is pumped from river to open reservoir in nearby hills, thence flows by gravity to distribution system. No treatment except chlorination with hypochlorite solution at the main pump before entering reservoir.
Storage Capacity: Open reservoir.
Consumption: No record; estimated at 0·144 to 0·212 m.g.d.
Industrial Use: No major industries.
Remarks: Consideration was being given at time of survey to using nearby Lac Thibeault, and piping it into the reservoir by gravity.

Grenville

Population: about 1,000 (1949).
Date of Survey: July 8, 1947; June 9, 1949.
Ownership: Municipally owned and operated.
Source of Supply: A small mountain lake.
Treatment: Water flows by gravity to system without treatment (100 p.s.i. pressure).
Storage Capacity: One, 75,000 gallons.
Consumption: Not known.
Industrial Use: No major industries; one small sawmill in village.

Hampstead

Population: 2,900 (1948).
Date of Survey: 1949.
Ownership: Municipally owned and operated.
Source of Supply: Purchased from the city of Montreal.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Average: 0·232 m.g.d. (May 1947 to May 1948).
Industrial Use: No data.
Remarks: For details regarding water supply, treatment and analysis, *See* Montreal, Que.

Hudson

Population: 1,950, including Hudson Heights and Como.
Date of Survey: June 17, 1947.
Ownership: Privately owned and operated.
Source of Supply: Same as for Como, except that springs may be different.
Treatment: None.
Storage Capacity: Open reservoir in hills.
Consumption: No record.
Industrial Use: No industrial use; tourist resort.

Hudson Heights

Population: 750.
Date of Survey: June 17, 1947.
Ownership: Same as for Hudson and Como, Que.
Source of Supply: Mountain springs: different springs may be used in different areas.
Treatment: None. Springs flow by gravity to reservoirs and system.
Storage Capacity: Two, 120,000 gallons total.
Consumption: No record.
Industrial Use: No major industrial use; a summer resort.

Hull

Population: 38,600 (1949).
Date of Survey: January 30, 1947; June 2, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Ottawa River above Chaudière Falls.
Treatment: In 1949, water drawn by gravity from 1,000 feet out in river through concrete pipe laid on rock bottom, then in cast iron pipe to plant. Chlorination at rate of 22 lbs./m.g. just ahead of the electric and water-driven pumps that take the water direct to mains.
Storage Capacity: None.
Consumption: About 18 m.g.d. (1947); 11 m.g.d. (1949).
Industrial Use: Two major paper plants both having their own water supplies. Several smaller industries and religious institutions.

QUEBEC—Continued

Joliette

Population: 14,500 (1947).
15,300 (1949).

Date of Survey: June 25, 1947; 1949.
Ownership: Municipally owned and operated.
Source of Supply: L'Assomption River nearby.
Treatment: Water enters by gravity from river; alum is dry-fed at rate of 1·5 to 2·0 g.p.g., then water is low-lifted to coagulating basins (capacity 3 m.g.d.). After a retention time of 3 to 3½ hrs., water flows by gravity to four modern rapid sand filters (20 by 16 feet); thence to clear well where lime is added (dry-fed) in amount to about half the alum used. pH of final water checked periodically to control lime-feed. Chlorination at clear well at rate of 5 lbs./m.g. to give residual of 0·2 p.p.m. Filters normally backwashed daily; at times it may be necessary to backwash more often (12 to 18 hrs.); air and water backwash. Filter rate at time of survey was 18,000 gals./hr. with only two filters operating.
Storage Capacity: Clear well, 125,000 gallons.
Consumption: Average: 1·5 to 1·7 m.g.d. (1947); up to 2 m.g.d. (1949).
Industrial Use: The following use the civic supply: a cast iron foundry; Acme Glove Mfg. Co.; a biscuit manufacturer; a lime manufacturer; Canadian Pacific Railway; and Canadian National Railway.

Lachine

Population: 27,000 (June 1947) 28,300 (Lachine)
8,000 (Ville La Salle)
Total 36,300 (March 1949)

Date of Survey: June 1947; March 15, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Lake St. Louis, below mouth of Ottawa River.
Treatment: In 1949, water enters by gravity into sump well from two intake pipes (36-inch diam.) 450 and 850 feet out in lake. Water is prechlorinated in the sump well to 8 p.p.m. residual and alum (two dry-feeders) is added at rate of 1·5 to 2·75 g.p.g. Water is then low-lifted to four coagulating basins of 700,000 gallons capacity each, with normal retention time of 4½ hours. Then water flows by gravity to 16 modern rapid sand filters, air and surface-water backwashed; filter capacity 1 m.g.d. each. Lime is added at rate of 0·33 to 0·75 g.p.g. to give final pH about 7·5. Water then goes to clear well where post-chlorination to final residual of 0·1 to 0·2 p.p.m. is carried out.
Storage Capacity: Clear water reservoir, 3·1 m.g.
Consumption: 6 m.g.d., with public use 60 per cent metered, industrial 100 per cent metered.
Industrial Use: The following are the main industrial users: Northern Electric Co., Ltd.; Dominion Engineering Co., Ltd.; Dominion Bridge Co., Ltd.; Jenkins Valves Co., Ltd.; Dominion Wire Rope Co., Ltd.; Can. Allis-Chalmers Co.; Meredith Simmons; British Rubber Co.; Saxonia Fruit Preserving Co., Ltd.; Anglo-Canadian Wire Rope Co.
Remarks: Lake St. Louis at Lachine is at times a mixture of Ottawa River and St. Lawrence River waters (60 to 70 per cent Ottawa River), but at other times may be all St. Lawrence River water due to flow conditions.

Lachute

Population: 5,350.
Date of Survey: July 5, 1947.
Ownership: Municipally owned, operated by a public utilities commission.
Source of Supply: Pollock Creek, 2 to 3 miles from town.
Treatment: Water is piped by gravity under the North River from dammed-up creek in hills. At city limits water is chlorinated with gaseous chlorine at rate of 200 lbs./month (6·7 lbs./day).
Storage Capacity: None.
Consumption: About 0·7 m.g.d.
Industrial Use: Principal users are Canadian Pacific Railway and J. C. Wilson Paper Mill. Ayres Ltd. (pharmaceuticals) have own deep well as water source.

L'Annonciation

Population: about 2,000.
Date of Survey: July 10, 1947.
Ownership: Municipally owned and operated.
Source of Supply: A small mountain lake and stream.
Treatment: Water flows by gravity and is given no treatment.
Storage Capacity: Two open reservoirs at source. Capacity unknown.
Consumption: No record.
Industrial Use: Sawmills; no main industrial use of water.

La Salle (Ville La Salle)

Population: 7,150 (1947).
8,000 (March 1949).
Date of Survey: March 15, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Purchased from city of Lachine.
Treatment: *See* Lachine, Que.
Storage Capacity: None.
Consumption: About 0·5 m.g.d.
Industrial Use: No data; various types of manufacturing.
Remarks: *See* Lachine for details of treatment and analyses.

L'Assomption

Population: about 1,800.
Date of Survey: June 24, 1947.
Ownership: Municipally owned and operated.
Source of Supply: L'Assomption River nearby.
Treatment: Water enters by gravity, is chlorinated and then pumped to reservoir and to mains.
Storage Capacity: Elevated tank, 35,000 gallons.
Consumption: 0·4 to 0·6 m.g.d.
Industrial Use: No major industrial user.

Laurentides

See St. Lin, Quebec.

Laval des Rapides

Population: 4,010.
Date of Survey: March 23, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Rivière des Prairies (one of the mouths of the Ottawa River).
Treatment: Water entering by gravity is screened, alum-treated at rate of 3 g.p.g., coagulated and filtered through rapid sand filters. Lime is added at rate of 50 lbs./24 hrs. (125 lbs./m.g.) and water is finally chlorinated (1½ lbs./m.g.) and pumped to reservoir and system.
Storage Capacity: 83,300 gallons.
Consumption: Average: 0·4 m.g.d.
Industrial Use: Principal industrial user is Will & Baumer Candle Co., Ltd.

QUEBEC—Continued

L'Epiphanie

Population: 2,500 (In municipality)
125 (Outside municipality)
Total 2,625

Date of Survey: March 18, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Well and small stream.
Treatment: No treatment is carried out. From 6 a.m. to 9 p.m. well water is pumped direct into the system. During the day and night water flowing by gravity from the stream and reservoirs also supplies the mains. The civic supply is therefore normally a varying mixture of well and surface water.
Storage Capacity: Cement and wood reservoirs for the surface water, four in number.
Consumption: No record; estimated at 0·15 m.g.d.
Industrial Use: Main users are: The Canada Mfg. Co., Ltd.; The Quebec Veneer Industries; The Woolshire Mfg. Co.; L'Epiphanie Mfg. Enrg.; Frenette & Frère Enrg.; Forest, Ltd. (cigars); and Shulman Dress Co.

Maniwaki

Population: about 3,500.
Date of Survey: July 24, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Two deep wells, near town.
Treatment: No treatment or chlorination. The wells are pumped directly at rate of about 200 g.p.m. for an average of 16 hours daily into the mains and to the reservoir on a hill situated in the town.
Storage Capacity: One elevated tank on hill, 85,000 gallons.
Consumption: 0·1 to 0·15 m.g.d.
Industrial Use: No major industries. Coca Cola Bottling Works use one sand and one activated carbon pressure-filter in treating this water for use in beverage manufacture.

Masson

Population: 1,200 (1949)
Date of Survey: July 11, 1947; June 1949.
Ownership: Municipally owned and operated.
Source of Supply: Lièvre River water, purchased from the town of Buckingham, Que.
Treatment: *See* Buckingham, Que.
Storage Capacity: None.
Consumption: 0·15 m.g.d.
Industrial Use: No major industries use this civic water. MacLaren's Pulp & Paper Mill have their own supply from the river.

Montebello

Population: 1,400 (In village).
200 to 600 (At Seigniory Club).
Total 1,600 to 2,000

Date of Survey: June 8, 1949.
Ownership: System owned and operated by Seigniory Club Community Association, Ltd.
Source of Supply: Echo Lake, 5 miles distant on property owned by Seigniory Club.
Treatment: No treatment. Water flows by gravity under head of 672 feet through reducing valves to town reservoirs and system.
Storage Capacity: Three tanks; one of 12,000 gallons, and two of 104,000 gallons each.
Consumption: 0·17 to 0·33 m.g.d. in summer.
Industrial Use: One small sawmill. Montebello is a tourist resort and farming centre.

QUEBEC—Continued

Mont Laurier

Population: 3,100 (1947).
4,500 (1949).

Date of Survey: July 10, 1947; 1949.
Ownership: Municipally owned and operated.
Source of Supply: Lac Thibeault, 2 miles distant in the direction of St. Jovite, Quebec.
Treatment: No treatment. Water enters mains by gravity.
Storage Capacity: None.
Consumption: No record and no meters in 1947, but estimated at 0·4 m.g.d. in 1949.
Industrial Use: Main industry is lumbering and sawmilling.

Montreal

Population: May 1947 to May 1948, 1,122,295 (City).
*73,034 } (Outside municipalities).
**123,692 }
Total 1,319,021

Date of Survey: February 20, 1947; 1949.
Ownership: Municipally owned and operated.
Source of Supply: St. Lawrence River above Lachine Canal and below mouth of Ottawa River, usually a mixture of Ottawa River water and St. Lawrence River water.
Treatment: Water is pumped from the river through two intakes, one out 1,000 yards in river, and one nearer shore, the latter drawing mostly Ottawa River water.

The percentage of Ottawa River water (average colour 40 to 50 p.p.m., alkalinity 20 p.p.m. as $CaCO_3$) entering plant is controlled so that colour is kept low and no colour removal by alum is required. St. Lawrence River water averages 5 to 10 p.p.m. colour, and 90 p.p.m. alkalinity as $CaCO_3$. Percentage Ottawa River water is calculated on basis of average alkalinities.

The water flows in the aqueduct or open canal for several miles and then goes from the canal directly after screening to 48 (in 1949, 64) rapid sand filters. Filters are backwashed with air for 6 minutes, then with water to give average runs of 24 up to 96 hours.

No chemical treatment of water is done other than chlorination to a residual of 0·2 to 0·25 p.p.m. using average dosage of 0·8 p.p.m. Chlorine residuals are automatically recorded and control chlorine dosage. Plant laboratory carries out bacteriological control tests and daily tests on raw and finished water for pH, colour, etc.

Storage: One, 45 m.g.; one, 37 m.g.; one, 7 m.g.; and three smaller ones; 6½ acres of old, slow sand filters are to be converted into a reservoir for treated water.
Consumption: Average: 153 m.g.d. (1947).
May 1947 to May 1948, city and municipalities* — 153·27 m.g.d.
May 1947 to May 1948, outside municipalities** — 10·17 m.g.d.
Industrial Use: In the city of Montreal there is represented almost all classes of industry. These use civic supply for a variety of processes although treatment is necessary for many uses.
Remarks: Work was under way in 1947 and 1949 to extend the intakes into the river so as to draw all St. Lawrence River water.

Montreal East

Population: 3,225 (1947).
Date of Survey: 1948.
Ownership: Owned and operated by city of Montreal.
Source of Supply: Water purchased from Montreal; system owned and operated by the city of Montreal.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Included in daily consumption of Montreal.
Industrial Use: *See* Montreal, Que.

* Municipalities which purchase water but whose systems are owned and operated by city of Montreal are: Outremont, Westmount, Ville St. Pierre, Montreal East, Pointe aux Trembles, Saraguay.
** Municipalities which purchase finished water from Montreal but which own and operate their own systems are: Montreal North, Montreal West, Mount Royal, Notre Dame de Liesse, Hampstead, St. Jean de Dieu, St. Laurent, St. Leonard, St. Michel, and Verdun.

QUEBEC—Continued

Montreal North

Population: 10,602 (1947).
Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from city of Montreal.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Average: 0·448 m.g.d. (May 1947 to May 1948).
Industrial Use: *See* Montreal, Que.

Montreal West

Population: 3,500 (1947).
Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from city of Montreal.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Average: 0·188 m.g.d. (May 1947 to May 1948).
Industrial Use: *See* Montreal, Que.

Mount Royal

Population: 8,336 (1947).
Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from city of Montreal filter plant.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Average: 0·749 m.g.d. (May 1947 to May 1948).
Industrial Use: *See* Montreal, Que.

Noranda

Population: 7,000.
Date of Survey: August 15, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Lake Dufault, 2 miles distant.
Treatment: Water is pumped from lake to plant on shore of Lac Tremoy; alum at rate of 10 lbs./24 hrs., and lime at rate of 100 lbs./24 hrs., added to the sump well. The water is then low-lifted to coagulating and settling basins and after 3 hours' retention, flows by gravity to three rapid sand filters (16 by 10 feet)—thence to clear well. Lime is added to the clear well just ahead of the main pumps, and chlorine at the rate of 10 to 12 lbs./day is added at the pumps to give a residual of 0·3 p.p.m.
The coagulating basin has two compartments. Filters are backwashed with water and rotary surface spray; normal filter run 14 hours at 840 gals./min.
Initial pH of water, 6·5; after coagulation and filtering, pH 5·5; lime-treated to final pH of about 7·6.
Storage Capacity: One elevated tank, 225,000-gallon capacity. One reservoir, 80,000-gallon capacity; in 1949 storage was increased by an 80,000-gallon reservoir.
Consumption: About 0·6 m.g.d.
Industrial Use: Major industry is copper mining, but the Noranda mine uses water directly from the same source with no treatment. The town plant also supplies Rouyn, Que.
Remarks: At time of survey visit, the plant was being enlarged to twice its present capacity. Plant previously used Lac Tremoy water but this has become polluted with mine waste drainage to pH 3·2 (*See* analysis, Part II, Station No. 96, pages 74-75).

QUEBEC—Continued

Notre Dame de Liesse

Population: 1,600 (1947).
Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Purchased from city of Montreal.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: No data.
Industrial Use: No data.

Outremont

Population: 31,464 (1947).
Date of Survey: 1948.
Ownership: Water system owned and operated by city of Montreal.
Source of Supply: Purchased from the city of Montreal.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Included in daily consumption for Montreal.
Industrial Use: No data.

Papineauville

Population: about 1,100.
Date of Survey: June 8, 1949.
Ownership: Privately owned and operated by P. Bonhomme.
Source of Supply: Two springs, 10 feet apart in nearby hills. There are seven other springs nearby that may be used.
Treatment: No treatment. System was developed in 1892 and renewed in 1939. Water flows by gravity from springs into concrete collecting basin nearby, then in steel pipe to reservoir 25 feet lower down the hill and finally to system.

System operates under 110-foot head, pressure in village varying from 25 to 40 p.s.i.
Storage Capacity: One open reservoir, 32,000 gallons.
Consumption: No record; estimated at 50,000 g.p.d.
Industrial Use: No major industry; one creamery uses this water.

Pointe aux Trembles

Population: 6,770 (1947).
Date of Survey: 1948.
Ownership: Owned and operated by the city of Montreal, Que.
Source of Supply: Purchased from the city of Montreal.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Included in Montreal water consumption.
Industrial Use: No data.

Pointe Claire

Population: 4,550; in summer up to 7,000.
Date of Survey: June 18, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Lake St. Louis, below mouth of Ottawa River.
Treatment: From intakes 900 feet out in lake, water enters sump well by gravity and is pumped to small coagulating basins (unbaffled). Alum (usually 1·5 to 1·75 g.p.g.) is added at the pump to the coagulating basin. After settling in underground basins, the water flows by gravity to four rapid sand filters, two of which are now using anthrafilt instead of sand. At date of

QUEBEC—Continued

Pointe Claire—Continued

survey filter runs were 15 to 18 hours. Water then flows by gravity to clear well, where lime is dry-fed at rate of about 150 lbs./day to give final pH 7·2. Chlorine added at clear well ahead of the main pump to a residual of 0·2 p.p.m.
The plant is quite old, with coagulating basins and filters on one side of the highway and pumping station and clear wells on the other side.

Storage Capacity: One reservoir, 250,000 gallons.
Consumption: No record; but estimated from pumps at 0·7 to 0·8 m.g.d. in summer; probably 0·4 m.g.d. in winter.
Industrial Use: No data.

Pointe Gatineau

Population: 2,600.
Date of Survey: June 2, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Gatineau River nearby.
Treatment: System is 20 years old. Water enters sump well by gravity and from there is pumped direct to mains and reservoir with chlorination at pump at average rate of 100 lbs./month (3·3 lbs./day).
Storage Capacity: One standpipe, 35,000 gallons.
Consumption: Estimated from pumps at 0·14 to 0·18 m.g.d.
Industrial Use: No major industrial user.

Pont Viau

Population: 5,000.
Date of Survey: March 21, 1949.
Ownership: Privately owned and operated by Gerard Coderre.
Source of Supply: Artesian well.
Treatment: No treatment. Water is pumped directly to reservoir and system.
Storage Capacity: One elevated tank, 45,000 gallons.
Consumption: 0·2 m.g.d., of which 40,000 g.p.d. are industrially and commercially used.
Industrial Use: Laundries, foundry, and usual small commercial users.

Rawdon

Population: about 1,250, but heavy increase in summer due to tourists.
Date of Survey: June 30, 1947.
Ownership: Privately owned and operated by H. Lord.
Source of Supply: Several creeks in nearby hills.
Treatment: No treatment; it is understood that chlorination has been started since the survey date. Water is pumped during the summer but enters system by gravity in other seasons.
Storage Capacity: One reservoir, 5 m.g.
Consumption: 0·15 to 0·25 m.g.d.
Industrial Use: There is no major industry at Rawdon, which is mainly a summer resort.

Rigaud

Population: 2,000.
Date of Survey: July 28, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Three wells and two springs. Wells are 185, 205, and 270 feet deep.
Treatment: No treatment. Water from springs enters system by gravity; during the summer, June to October, wells are pumped directly into standpipe and system.
Storage Capacity: One 120,000-gallon reservoir for wells at 293-foot head; one 74,000-gallon reservoir.
Consumption: Wells, 0·2 m.g.d.
Spring No. 1, 28,000 g.p.d.
Spring No. 2, 71,400 g.p.d.
Industrial Use: A tannery, one foundry, one small dress manufacturing plant, and one woodworking plant. A college, population 525, also uses this water.

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QUEBEC—Continued

Rivière des Prairies

Population: 1,150.
Date of Survey: 1948 (data from Water & Sewage Directory).
Ownership: Municipally owned and operated.
Source of Supply: Purchased from city of Montreal.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: No data.
Industrial Use: No data.

Rouyn

Population: 11,080, but only about 8,000 to 9,000 use this civic supply.
Date of Survey: August 15, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from Noranda, Quebec.
Treatment: *See* Noranda, Que.
Storage Capacity: One reservoir, 150,000 gallons.
Consumption: 0·4 to 0·5 m.g.d.
Industrial Use: No major industrial use.

Saraguay

Population: no data.
Date of Survey: 1948.
Ownership: Owned and operated by city of Montreal.
Source of Supply: Water supplied from city of Montreal filtration plant.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: No data; included in pumpage for Montreal, Que.
Industrial Use: No data.

Senneville

Population: 500 to 600.
Date of Survey: June 1947.
Ownership: Municipally owned and operated.
Source of Supply: Water supplied to eighty families from Ste. Anne de Bellevue water works.
Treatment: *See* Ste. Anne de Bellevue, Que.
Storage Capacity: None.
Consumption: No data; included in pumpage for Ste. Anne de Bellevue.
Industrial Use: No major industrial user.

Shawville

Population: 900.
Date of Survey: August 4, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Two or three springs near edge of village.
Note: One tank reservoir on hill, using nearby small lake, supplies fire hydrants.
Treatment: None. Water pumped direct to distribution system.
Storage Capacity: None.
Consumption: No record; estimated at 3,000 g.p.d.
Industrial Use: No major industrial use.

Ste. Agathe des Monts

Population: 4,000; increasing to 15,000 in summer.
Date of Survey: July 7, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Petit Lac des Sables, 2½ miles distant.
Treatment: No treatment. Water from lake (360 by 700 feet) flows by gravity to system to give town pressure of 70 p.s.i. At time of survey, pump being installed to raise pressure in system at high point in town.
Storage Capacity: None.
Consumption: No record; but estimated at 1 m.g.d. when tourist traffic heavy.
Industrial Use: No major industrial use; five finishing lumber mills; tourist trade.

Ste. Anne de Bellevue

Population: 3,500 (including Senneville).
Date of Survey: June 18, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Ottawa River, just above mouth of river and above canal locks.
Treatment: Water enters sump well from 800 feet out in Ottawa River. Water is prechlorinated here at rate of 5·5 to 6·0 lbs./24 hrs., then alum dry-fed normally at rate of 1·5 to 1·75 g.p.g. (at time of visit 2·5 g.p.g.). Water then low-lifted to four coagulating and settling basins with retention time of 2 to 2¼ hrs.; then flows to four rapid sand filters (20 by 20 feet) and finally pumped to mains and reservoirs after post-chlorination to a residual of 0·2 p.p.m. Filters backwashed every 12 to 15 hrs. Filter rates vary from 250 g.p.m. to 600 g.p.m. per filter. Chlorine machines situated so that plant can be by-passed and water only chlorinated. In spring, chlorine demand may rise to 14 lbs./24 hrs.
Storage Capacity: One elevated concrete tank, 167,000 gallons.
Consumption: 0·7 to 1·2 m.g.d.
Industrial Use: Water used by large military hospital, Canadian National Railway, and a part of Senneville, Que., also supplied with water. (*See* Senneville, Que.).

Ste. Anne des Plaines

Population: 1,850.
Date of Survey: 1949 (data from Water & Sewage Directory).
Ownership: Privately owned and operated by L'Aqueduc Ste. Anne des Plaines, Inc.
Source of Supply: Two wells.
Treatment: No treatment. Water pumped direct to system and reservoirs.
Storage Capacity: Two; 30,000 and 6,000 gallons.
Consumption: 25,000 to 30,000 g.p.d.
Industrial Use: No data.

St. Eustache

Population: 2,436 (In municipality).
516 (Outside municipality).
Total 2,954

Date of Survey: April 1949.
Ownership: Privately owned and operated.
Source of Supply: Wells and springs.
Treatment: No treatment. Water pumped directly to system from reservoir.
Storage Capacity: One reservoir.
Consumption: 0·27 m.g.d.; industrial use about 30,000 g.p.d.
Industrial Use: Canning factory, manufacture of toys, and planing mill.

93295—7½

QUEBEC—Continued

St. Félix de Valois

Population: 1,200 (In municipality).
50 (Outside municipality).
Total 1,250

Date of Survey: March 17, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Springs and drainage basin.
Treatment: No treatment. Water flows by gravity to system from reservoir.
Storage Capacity: One reservoir, 300,000 gallons.

Consumption:

	Average g.p.d.	Maximum g.p.d.	Minimum g.p.d.
Public	60,000	110,000	40,000
Ind. and Comm.	1,000	2,000	300

Industrial Use: No major industry; soft drink manufacture.

St. Henri de Mascouche

Population: 500 to 600.
Date of Survey: March 21, 1949.
Ownership: Municipally owned and operated.
Source of Supply: Springs and drainage basin.
Treatment: No treatment. Water flows by gravity from reservoirs to system.
Storage Capacity: Two reservoirs.
Consumption: Average: 25,000 g.p.d.
Industrial Use: No major industrial user.

St. Jean de Dieu (Montreal)

Population: 7,061 (1947).
Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from city of Montreal filtration plant.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Average: 0·554 m.g.d.
Industrial Use: No data.

St. Jérôme

Population: 15,300.
Date of Survey: June 24, 1947.
Ownership: Municipally owned and operated by a public utilities commission.
Source of Supply: Springs and wells. North River is maintained as standby supply, as pumping plant is above town on the bank of the river.
Treatment: No treatment except chlorination. Water is pumped from springs and wells to reservoirs and mains.
Storage Capacity: Two reservoirs, 200,000 and 500,000 gallons.
Consumption: Average: 1·2 m.g.d.
Industrial Use: Main industries are Regent Knitting Mills and Dominion Rubber Co., but both use North River for most industrial processing.

QUEBEC—Continued

St. Jovite

Population: 1,000; increases at time to 1,500 in summer. Outlying parish and tourist lodges not supplied.

Date of Survey: July 7, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Lake Duhamel, a small mountain lake in hills, 2 miles distant on other side of Diable River.
Treatment: No treatment. Water flows from lake by gravity to system.
Storage Capacity: None, other than lake.
Consumption: No record.
Industrial Use: No main industries, other than sawmills.

St. Leonard (Montreal)

Population: 610.

Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from city of Montreal filtration plant.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Average: 46,000 g.p.d.
Industrial Use: No data. *See* Montreal, Que.

St. Lin (Laurentides)

Date of Survey: 1948 (data from Water & Sewage Directory).
Ownership: Municipally owned and operated.
Source of Supply: L'Achigan River nearby, and well.
Treatment: No treatment other than chlorination. Water is pumped direct to system and reservoir.
Storage Capacity: One reservoir, 25,000 gallons.
Consumption: No data.
Industrial Use: No data.

St. Michel (Ville St. Michel)

Population: 6,139.

Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from city of Montreal filtration plant.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Average: 0·437 m.g.d.
Industrial Use: No data.

St. Paul l'Ermite

Population: 1,800 (In municipality).
400 (Outside municipality).
Total 2,200

Date of Survey: March 1 to 4, 1949.
Ownership: Privately owned and operated by Canadian Arsenals, Ltd. This plant supplies the town.
Source of Supply: Ouareau and L'Assomption Rivers, principally the latter.
Treatment: Water from rivers is treated with alum at a rate of 2·0 to 2·5 g.p.g. After settling, water is filtered through four rapid sand filters, each 256 square feet in area, operating at rate of 2 gals./sq. ft./minute. Lime is added at rate of about $\frac{1}{3}$ that of alum. Water finally chlorinated and pumped to mains and reservoirs.
Storage Capacity: One, 2 m.g.; one surge tank, 50,000 gallons.
Consumption: Average: 0·175 to 0·2 m.g.d.
Industrial Use: Main industrial users are: Canadian Arsenals, Ltd.; Wolfe Cap Co.; Canadian Spool Cotton Co.; Gallant Paint Co.; Ross Chemicals Works; Barnebey, Ltd.; and a lumber company.

QUEBEC—Continued

Ste. Rose

Population: 2,300 (Ste. Rose).
1,450 (Ste. Rose West).
Total 3,750

Date of Survey: June 23, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Two artesian wells and Rivière des Mille Iles (one mouth of Ottawa River). Normal use about 50 per cent each of wells and river.
Treatment: Water from artesian wells enters clear well under own pressure. River water pumped to small mixing chamber where alum is added. Water then goes to underground coagulating and settling basins and then by gravity to two rapid sand filters (14 by 8 feet); water then flows to clear well, mixing with the well water. Chlorine is added to this clear well at rate of about 4·2 lbs./m.g. to give residual of 0·2 p.p.m. Filters backwashed every 6 hours.
Storage Capacity: One reservoir, 100,000 gallons.
Consumption: Average: 0·4 to 0·5 m.g.d., including Ste. Rose West.
Industrial Use: No data.
Remarks: Neighbouring area said to have many artesian wells containing varying amounts of sulphides.

Ste. Rose West

Population: 1,450.
Date of Survey: 1948 (data from Water & Sewage Directory).
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from Ste. Rose, Que.
Treatment: *See* Ste. Rose, Que.
Storage Capacity: None.
Consumption: Included in Ste. Rose pumpage.
Industrial Use: No data.

Ste. Thérèse de Blainville

Population: 4,650.
Date of Survey: June 26, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Three wells, 200 to 300 feet deep in nearby rock; one spring some distance from wells.
Treatment: No treatment carried out on either supply. Water flows by gravity from springs to reservoirs near deep wells, which are pumped into same reservoirs and mains.
Storage Capacity: Two, 48,000 and 4,000 gallons.
Consumption: Average: 0·4 to 0·5 m.g.d.
Industrial Use: No major industrial user.

St. Vincent de Paul

Population: 1,500 (Municipality).
1,500 (Penitentiary).
Total 3,000

Date of Survey: March 9, 1949.
Ownership: Owned and operated by Dominion Government. (Dept. of Justice, Penitentiary Branch).
Source of Supply: Rivière des Prairies (one mouth of Ottawa River).
Treatment: Raw water enters sump well by gravity, is alum-treated, filtered through four rapid sand filters, treated with lime and carbon to adjust pH and control taste, and finally chlorinated before pumping to reservoir and mains.
Storage Capacity: One elevated tank, 200,000 gallons; one underground reservoir, 200,000 gallons.

QUEBEC—Continued

St. Vincent de Paul—Concluded

Consumption:

	Average m.g.d.	Maximum m.g.d.	Minimum m.g.d.
Domestic	0·160	0·172	0·081
Total	0·550	0·750	0·426

Industrial Use: Main user is the St. Vincent de Paul Penitentiary.

Timiskaming

Population: 3,000, including Lumsden Mills.
Date of Survey: August 11, 1947.
Ownership: Privately owned and operated by Canadian International Paper Co.
Source of Supply: Gordon Creek, 1 mile distant.
Treatment: From a dam on Gordon Creek, water passes through two coarse screens and then ten rotary, fine screens. Water then goes direct to plant in large wooden main. Town draws water from this main by gravity and the supply is then chlorinated. A small part (40 g.p.m.) of total consumption is passed through a small pressure-filter by booster pump and is also chlorinated.

Lumsden Mills area near dam is supplied through one tap, creek water being chlorinated here with hypochlorite solution.
Storage Capacity: None.
Consumption: No meters; estimated 0·72 m.g.d., exclusive of Lumsden Mills supply.
Industrial Use: Main industry is Canadian International Paper Co., who use water directly after screening for many uses and treat it in plant for additional process uses. For drinking water in plant, ozone is used as sterilizing agent.

Terrebonne

Population: 2,200.
Date of Survey: June 27, 1947.
Ownership: Municipally owned and operated.
Source of Supply: Springs and wells, 1½ miles distant.
Treatment: No treatment. Water is pumped to reservoirs and then goes to system by gravity.
Storage Capacity: One, 250,000 gallons; six, 25,000 gallons each; total capacity, 0·4 m.g.
Consumption: Average: 90,000 g.p.d.
Industrial Use: No major industrial user.

Thurso

Population: 1,300.
Date of Survey: June 8, 1949.
Ownership: Municipally owned and operated.
Source of Supply: River Blanche, north of town.
Treatment: The water is taken directly from the river at the pumphouse below dam, chlorinated, and pumped to reservoirs and system.
Storage Capacity: One elevated tank, 100,000 gallons.
Consumption: Average: 0·15 m.g.d.
Industrial Use: No major industrial user.

Verdun

Population: 74,450 (1947).
Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Water purchased from city of Montreal filtration plant.
Treatment: *See* Montreal, Que.
Storage Capacity: None, other than that of Montreal, Que.
Consumption: Average: 5·545 m.g.d. for May 1947 to May 1948.
Industrial Use: Varied; no record.

Ville Marie

Population: 1,100.
Date of Survey: August 12, 1947.
Ownership: Municipally owned and operated.
Treatment: No treatment. Springs in hills are collected in reservoir, and water then flows by gravity to town.
Storage Capacity: Open reservoir in hills, 9 m.g.
Consumption: No record.
Industrial Use: No major industrial user.

Ville St. Laurent

Population: 10,104 (1947).
Date of Survey: 1948.
Ownership: Municipally owned and operated.
Source of Supply: Purchased from city of Montreal filtration plant.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: Average: 1·97 m.g.d. for May 1947 to May 1948.
Industrial Use: No data.

Ville St. Michel

(*See* St. Michel).

Ville St. Pierre (St. Pierre)

Population: 4,796 (1947).
Date of Survey: 1948.
Ownership: System owned and operated by city of Montreal.
Source of Supply: Montreal filtration plant.
Treatment: *See* Montreal, Que.
Storage Capacity: None.
Consumption: No record; included in figures given for Montreal, Que.
Industrial Use: No data.

Westmount

Population: 26,779 (1947).
Date of Survey: 1948.
Ownership: System owned and operated by city of Montreal.
Source of Supply: Supplied by city of Montreal.
Treatment: *See* Montreal, Que.
Storage Capacity: *See* Montreal, Que.
Consumption: Included in figures given for Montreal, Que.
Industrial Use: *See* Montreal, Que.

DESCRIPTION OF MUNICIPAL WATER SUPPLIES—Continued

QUEBEC—Concluded

ST. LAWRENCE RIVER WATERSHED

Longueuil, Montreal South, and St. Lambert are municipalities on the St. Lawrence River near the mouth of the Ottawa River and are included in this report for comparison only.

Longueuil

Population: 9,000 to 10,000 (including Montreal South and Côte Rouge).
Date of Survey: June 19, 1947.
Ownership: Municipally owned and operated.
Source of Supply: St. Lawrence River.
Treatment: New plant built in 1944. Water enters sump well from intake 1,700 feet out in river. Water is screened and alum is then added at rate of 1 to 1½ g.p.g. (in flood season 2 to 2¼ g.p.g.). After 20 minutes, water is low-lifted to coagulating and settling basins with 4-hour retention prior to filtration (four rapid sand filters, 27 by 14 feet); thence to clear well and chlorination at rate of 8 lbs./day to residual of 0·25 p.p.m.

Capacity filter rate 2-gal./min./filter. Filter runs are normally 24 to 36 hrs.; optimum coagulation pH = 6·8.
Storage Capacity: Clear well, 360,000 gallons; one tank, 85,000 gallons.
Consumption: Average: 1·7 to 2·0 m.g.d.
Industrial Use: Main industries are Westons (Fairchilds), Ltd., and Canadian Arsenals, Ltd.

Montreal South

Population: 1,650.
Date of Survey: 1947 (data from Water & Sewage Directory).
Ownership: Municipally owned and operated.
Source of Supply: Purchased from Longueuil, Que.
Treatment: *See* Longueuil, Que.
Storage Capacity: None.
Consumption: About 76,000 g.p.d.
Industrial Use: No data.

St. Lambert

Population: 7,800 (Municipality).
8,000 (Outside municipality).
Total 15,800 (1947).

Date of Survey: June 19, 1947; March 17, 1949.
Ownership: Municipally owned and operated.
Source of Supply: St. Lawrence River.
Treatment: (1949). From 2,500 feet out in river, water enters by gravity; it is then low-lifted to mixing chamber and alum added (1½ to 2 g.p.g.) as lump alum in solution. After about 2-hour retention in the coagulating and settling basins, the water flows by gravity through two rapid sand filters to clear wells with chlorination at the rate of 8 lbs./24 hrs. From the clear well the water is pumped to reservoirs and system. Filter runs are normally 18 to 24 hours.
Storage Capacity: Two elevated tanks; 110,000 and 100,000 gallons.
Consumption: Average: 1·5 m.g.d.
Industrial Use: Main industries are: L. E. Waterman Co. (pens); Asbestonos Corp.; Woods Manufacturing; dairy, etc.

TABLE XII

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Ontario

(In parts per million)

No.	Municipality	Almonte, Ont.			Arnprior, Ont.		Bourget, Ont.
	Source	Mixed wells	Well No. 1	Well No. 3	Madawaska River		Springs
		Raw and finished water			Raw water	Finished water	Raw and finished water
	Sampling point	Town tap	At pump	At pump	At intake	Plant tap	Town tap
1	Field No.	153	394	393	124	125	390
2	Laboratory Number	2364	3336	3229	2036	2338	3227
3	Date of collection	Sept. 26/47	June 16/49	June 16/49	Sept. 15/47	Sept. 15/47	June 15/49
4	Storage period (days)	383	67	12	269	386	13
5	Sampling temperature °C	10·5	9·0	9·0	22·8	23·4	19·0
6	Test temperature °C	Room	26·0	27·0	Room	Room (22·2)	27·0
7	Dissolved oxygen				(7·6)		
8	Carbon dioxide (CO_2)	(20·0)	(30·7)	(23·2)	(6·0)	(5·0)	(17·8)
9	pH	8·3(7·3)	7·9(7·5)	8·1(7·4)	8·0(7·9)	7·2(7·6)	7·2(7·0)
10	Colour	less 5	5 (5)	<5 (5)	32 (65·0)	17·0(50·0)	5·0(5–10)
11	Turbidity	0·5	0·5	1·9	(10)	3·0	1·6
12	Suspended matter, dried at 105°C						
13	Suspended matter, ignited at 550°C						
14	Spec. cond. (micromhos at 25°C)	363·2	458·1	503·0	119·7	126·5	172·0
15	Residue on evaperation, dried at 105°C	218·5		305·0	85·6	87·2	110·0
16	Ignition loss at 550°C	78·0		94·2	22·4	36·2	35·4
17	Calcium (Ca)	24·1(76·6)*	46·0(67·8)*	52·2(82·9)*	16·8	16·8	21·6
18	Magnesium (Mg)	28·8	24·0	24·3	3·2	3·5	2·6
19	Alkalis—as Na				2·6		
20	(Na)	8·1	8·5	13·5		2·2	3·3
21	(K)	2·1	2·2	3·2		1·3	0·9
22	Manganese (Mn)						
23	Iron (Fe) Total						
24	Diss.	0·016		0·04	0·06	0·17	0·09
25	Aluminium (Al)						
26	Sulphate (SO_4)	42·8	34·2	49·0	8·1	12·4	12·7
27	Chloride (Cl)	6·9(6·6)	10·2(6·3)	10·7(8·7)	0 (0)	0·6	0 (0)
28	Nitrite (NO_2)						
29	Nitrate (NO_3)	10·20		0·80	4·1	0	6·2
30	Fluoride (F)	0·20		0·25		0·26	0
31	Boron (B)						
32	Phosphate (PO_4)						
33	Bicarbonate (HCO_3)	147·6(317·2)	236·2(302·6)	223·7(327·0)	59·8(58·6)	58·5(63·4)	72·7(68·3)
34	Carbonate (CO_3)	4·8(0)	0 (0)	4·8(0)	0 (0)	0 (0)	0 (0)
35	Silica (SiO_2) Gravimetric	14·0		9·6		7·4	9·2
36	Colorimetric	14·8	8·8	9·2	10·0	4·8	12·0
37	Carbonate hardness as $CaCO_3$, p.p.m.	129·0(260·0)	193·6(248·0)	191·4(268·0)	49·0(48·0)	48·0(52·0)	59·6(56·0)
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	49·6(49·9)*	20·0(20·1)*	38·8(39·1)*	6·1	8·3	5·0
39	Total hardness as $CaCO_3$, p.p.m.	178·6(309·9)*	213·6(268·1)*	230·2(307·1)*	55·1	56·3	64·6
40	Soap-consuming power as $CaCO_3$, p.p.m.		(269·8)	(276·3)			
41	Saturation index	+0·4(+0·2)*	+0·44(+0·3)*	+0·70(+0·3)*	−0·44	−1·3	−1·0
	Remarks:	Long storage on No. 153 caused loss of CO_2 and development of phenolphthalein alkalinity with apparent precipitation of $CaCO_3$ and decreased hardness. There is a similar change even on shorter storage, but loss of $CaCO_3$ is much smaller. Note field determinations. Well No. 2 said to be same as Well No. 1. *Values calculated from field results.			A soft, highly coloured water. NOTE. Long storage has not appreciably affected water except a loss of colour, probably bleaching by light.		Note relative softness of this spring water and high Ca/Mg ratio.

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Ontario

(In parts per million)

Carleton Place, Ont.				Cobalt, Ont.	Deep River, Ont.	Eastview, Ont.	Englehart, Ont.	Ferris West Tp. Ont.	
Mississippi River				Lake Sasaginaga	Ottawa River	Purchased from Ottawa, Ont.	Mixed wells	Purchased from North Bay, Ont.	
Raw water		Finished water		Raw and finished water	Raw and finished water		Raw and finished water		
At intake	At intake 3-foot depth	Plant tap	Service stn. tap	Plant pump	Plant tap		Town tap		No.
168	392	152	391	118	72		115		1
1385	3219	2048	3221	2093	2087		2367		2
March 7/47	June 16/49	Sept. 26/47	June 16/49	Aug. 29/47	Aug. 7/47		Aug. 28/47		3
6	12	263	12	306	324		412		4
.....	25·5	13·0	26·0	22·2	22·8		12·0		5
Room	26·2	Room	26·2	Room	Room		21·1		6
.....	.....	.....	.....	.....	.....		.....		7
.....	(3·0)	(3·5)	.....	(1·5)	(8·0)		(4·0)		8
7·5	7·9(8·1)	8·0(7·9)	7·6(7·8)	7·9(8·25)	7·3(6·6)		8·8(7·9)		9
40	35 (60)	35 (35)	30 (40)	24 (30)	49 (45)		3 (35)		10
0·7	1·4	Less 7·0	1·4	Relatively clear	Relatively clear		7·3		11
.....	.....	.....	.....	.....	.....	*See* Ottawa, Ont.	4·0	*See* North Bay, Ont.	12
.....	.....	.....	.....	.....	.....		0·2		13
.....	201·6	206·5	205·6	120·6	57·42		467·6		14
148·0	.....	137·2	.....	75·8	57·4		303·5		15
.....	.....	49·4	.....	10·4	18·0		79·5		16
35·0	29·5	31·0	25·0	17·2	6·8		28·7		17
7·0	5·9	6·3	5·7	3·4	2·1		17·5		18
5·6	.....	1·7	.....	1·9	2·2		.....		19
.....	1·7	.....	1·3	.....	.....		45·4		20
.....	1·1	.....	1·0	.....	.....		4·8		21
.....	.....	.....	.....	.....	.....		.....		22
.....	.....	.....	.....	.....	.....		0·06		23
0·03	.....	0·03	.....	0·02	0·04		0·03		24
.....	.....	.....	.....	.....	.....		.....		25
20·6	15·6	8·9	13·8	10·0	9·5		7·8		26
0	1·7	1·5(1·7)	2·8	0	2·0		4·6(4·8)		27
0	.....	.....	.....	.....	.....		.....		28
3·5	.....	3·1	.....	3·5	2·2		2·22		29
.....	.....	.....	.....	.....	.....		0·60		30
.....	.....	.....	.....	.....	.....		.....		31
0	.....	.....	.....	.....	.....		.....		32
105·7	109·8(100·0)	114·7(111·0)	106·2(100·0)	53·3(58·6)	19·5(17·1)		261·1(300·1)		33
0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)		20·4(0)		34
5·0	.....	.....	.....	.....	.....		25·0		35
.....	3·8	13·0	4·1	3·2	6·4		17·6		36
86·6	90·0(82·0)	94·0(91·0)	85·8(81·0)	47·8(48·0)	16·0(14·0)		143·6(246·0)		37
29·5	8·0	9·3	0	9·1	9·6		0		38
116·1	98·0	103·3	85·8	56·9	25·6		143·6		39
.....	(80·1)	(90·0)	.....	53·6	.....		.....		40
−0·39	−0·01	−0·09	−0·40	−0·51	−2·0		+1·1		41
A typical coloured water of the Ottawa River watershed. Treatment shows little effect on chemical analysis.				Alkalis calculated.	Note. Only a small change in water due to long storage. Alkalis calculated.		High sodium content, some present as sodium bicarbonate. Long storage has caused change to carbonate and some $CaCO_3$ may have been deposited.		

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Ontario

(In parts per million)

No.	Municipality	Haileybury, Ont.		Hawkesbury, Ont.				Kemptville, Ont.	
	Source	Lake Timiskaming		Ottawa River				Wells	
		Raw water	Finished water	Raw water		Finished water		Raw and finished water	
	Sampling point	Town pump	Plant tap	Plant intake	Plant intake	Town tap	Plant tap	Tap Well No. 1	Tap Well No. 2
1	Field No.	116	117	226A	381	44	380	653	654
2	Laboratory No.	2045	2140	1592	3215	2018	3216	4386	4387
3	Date of collection	Aug. 29/47	Aug. 29/47	July 9/47	June 9/49	July 8/47	June 9/49	July 13/50	July 13/50
4	Storage period (days)	287	326	20	19	329	19	4	4
5	Sampling temperature °C.	21·0	21·0	.....	17·0	17·2	17·0	12·8	11·1
6	Test temperature °C.	Room	Room	Room	26·3	Room	26·3	27·3	27·3
7	Dissolved oxygen	.....	.....	.....	.....	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	(7·0)	(8·0)	.....	(3·0)	(1·0)	(9·7)	.....	.....
9	pH	7·0(6·8)	7·5(6·5)	6·9	7·2(7·3)	7·5(6·5)	7·0(6·3)	7·5	7·7
10	Colour	63 (110)	28 (75)	60	40 (70)	38 (50)	20 (55)	2	3
11	Turbidity	(15·0)	Clear	9·3	13·0 (About 10)	3·5(10)	8·4(10)	0·9	0·5
12	Suspended matter, dried at 105°C.	.....	.....	.....	.....	.....	.....	.....	.....
13	Suspended matter, ignited at 550°C.	.....	.....	.....	.....	.....	.....	.....	.....
14	Spec. cond. (micromhos at 25°C)	61·16	57·09	.....	81·5	72·49	105·9	648·0	630·2
15	Residue on evaporation, dried at 105°C.	55·0	48·8	78·0	.....	62·8	.....	389·4	373·4
16	Ignition loss at 550°C.	20·8	16·4	30·8	.....	21·2	.....	57·8	67·6
17	Calcium (Ca)	6·4	6·4	10·2	8·8	7·9	8·8	60·4	60·4
18	Magnesium (Mg)	3·0	2·4	3·3	2·1	2·1	1·4	28·8	28·0
19	Alkalis, as Na	4·5	.....	4·3	.....	7·0	.....	.....	.....
20	(Na)	.....	2·0	.....	1·3	.....	1·5	33·4	29·0
21	(K)	.....	1·0	.....	0·9	.....	0·9	4·2	3·8
22	Manganese (Mn)	.....	.....	.....	.....	.....	.....	.....	.....
23	Iron (Fe) Total	0·24	.....	0·35	.....	0·20	.....	.....	0·21
24	Diss.	.....	0·05	.....	.....	.....	.....	0·14	0·11
25	Aluminium (Al)	.....	.....	.....	.....	.....	.....	.....	.....
26	Sulphate (SO_4)	10·5	10·8	11·2	10·3	13·7	19·1	58·7	53·4
27	Chloride (Cl)	1·7(1·7)	1·0(·95)	0	1·5	2·0	3·3	43·4	44·1
28	Nitrite (NO_2)	.....	.....	0	.....	.....	.....	.....	.....
29	Nitrate (NO_3)	3·5	0·60	2·7	.....	2·0	.....	0	0·53
30	Fluoride (F)	.....	.....	.....	.....	.....	.....	0·30	0·20
31	Boron (B)	.....	.....	.....	.....	.....	.....	.....	.....
32	Phosphate (PO_4)	.....	.....	.....	.....	.....	.....	.....	.....
33	Bicarbonate (HCO_3)	28·6(19·5)	15·9(14·6)	36·1	31·7	17·1(19·5)	22·0(12·2)	277·9	261·6
34	Carbonate (CO_3)	0 (0)	0 (0)	0	0	0 (0)	0 (0)	0	0
35	Silica (SiO_2) Gravimetric	.....	3·4	7·8	.....	5·0	.....	.....	.....
36	Colorimetric	5·8	5·2	2·0	5·0	6·6	4·6	9·4	8·8
37	Carbonate hardness as $CaCO_3$, p.p.m.	22·0(16·0)	13·0(12·0)	29·6	26·0	14·0(16·0)	18·0(10·0)	227·8	214·4
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	6·3	12·8	9·4	4·6	14·4	9·7	41·4	51·5
39	Total hardness as $CaCO_3$, p.p.m.	28·3	25·8	39·0	30·6	28·4	27·7	269·2	265·9
40	Soap-consuming power as $CaCO_3$, p.p.m.	(24·2)	(22·5)	.....	.....	(24·9)	.....	.....	.....
41	Saturation index	−2·2	−1·9	−1·9	−1·7	−1·8	−2·1	+0·22	+0·37
	Remarks:	Long storage has caused considerable loss in colour. Note high negative saturation index.		A typical, highly-coloured, soft water. Higher turbidities here due, it is believed, to a clay bank upstream; note high negative saturation index.				Both wells are apparently drawing from the same water-table.	

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Ontario

(In parts per million)

Kirkland Lake, Ont.	Larder Lake, Ont.		Nepean Twp.	New Liskeard, Ont.			North Bay, Ont.				No.
McTavish, Victoria, and Gull Lakes	Larder Lake	Deep Well	Purchased from Ottawa, Ont.	Mixed Wells			Trout Lake				
Raw and finished water	Raw and finished water	Raw and finished water		Raw and finished water			Raw and finished water				
Town tap	Town tap	Town tap		Town tap	From ground reservoirs		At main pumps		At sump well		
113	112	525		85	172A	328	76	171	171a	194	1
2141	2119	3616		2363	1822	2313	2139	1789	1820	2291	2
Aug. 28/47	Aug. 27/47	Dec. 5/49		Aug. 13/47	Feb. 9/48	Aug. 9/48	Aug. 9/47	Jan. 4/48	Feb. 9/48	Aug. 9/48	3
327	320	7		427	14	49	346	24	8	52	4
19·2	18·0	16·2		8·5	.....	.....	22·8	.....	.....	.....	5
Room	Room	23·0		Room (21·1)	Room	Room	Room	Room	Room	21·4	6
.....	.....	.....		.....	.....	.....	.....	.....	.....	.....	7
(5·0)	(1·0)	.....		(14·0)	.....	.....	(3·0)	.....	.....	.....	8
6·3(7·2)	8·7(8·3)	8·2		8·2(7·5)	7·9	7·8	7·1(6·8)	6·7	6·7	7·0	9
14 (15)	11 (60)	2		0 (7)	10	10	11 (10)	.....	25	10	10
(Less than 7·0)	(About 10·0)	0		2·5	.....	8·4	Clear	1·0	2·9	5·7	11
.....	.....	.....	*See* Ottawa, Ont.	.....	.....	7·2	.....	.....	.....	2·0	12
.....	.....	.....		.....	.....	4·0	.....	.....	.....	0·6	13
124·4	133·2	182·4		483·0	604·3	628·5	52·8	48·95	55·9	49·6	14
84·0	85·4	119·8		349·6	365·6	399·4	41·2	38·4	43·6	44·8	15
20·2	11·6	15·8		60·0	105·6	90·0	12·0	13·8	13·4	15·0	16
18·6	16·6	28·2		33·7(69·3)	64·0	65·0	5·2	4·4	5·5	4·8	17
4·4	4·3	5·5		36·2	35·4	34·6	1·9	1·8	3·1	2·2	18
.....	3·1	.....		.....	.....	.....	.....	5·1	.....	.....	19
2·0	.....	8·0		18·7	18·0	19·5	2·5	.....	3·0	2·0	20
1·0	.....	0·5		2·6	2·0	2·8	1·5	.....	1·5	2·0	21
.....	.....	.....		.....	.....	.....	.....	.....	.....	.....	22
.....	.....	.....		.....	.....	0·24	.....	0·21	Trace	0·07	23
0·03	0·03	0·02		0·048	0·10	0·058	0·04	.....	.....	0·02	24
.....	.....	.....		.....	.....	.....	.....	.....	.....	.....	25
18·2	13·9	8·9		112·8	90·8	95·6	11·1	11·4	12·0	10·2	26
3·9(3·7)	0·6	0		0·9	1·3	0·6	2·3	2·0	0	0	27
.....	.....	.....		.....	Trace	.....	.....	0	0·05	.....	28
6·2	3·1	0·35		0·62	0·57	0·53	0·80	0·75	1·33	0·40	29
0·20	.....	0·05		1·36	.....	1·2	0·10	.....	.....	0	30
.....	.....	.....		.....	.....	.....	.....	.....	.....	.....	31
.....	.....	.....		.....	.....	.....	.....	.....	.....	.....	32
41·2(43·9)	45·9(53·7)	110·0		180·6(296·5)	306·2	292·8	14·6(14·6)	26·8	23·0	14·6	33
0 (0)	6·2(0)	2·4		0 (0)	0	0	0 (0)	0	0	0	34
1·6	2·2	8·6		14·4	10·2	12·8	3·4	4·0	5·8	8·5	35
3·9	3·1	12·6		11·2	10·8	8·2	5·8	3·4	5·2	2·8	36
33·8(36·0)	48·0(44·0)	93·0		148·0(243·0)	251·0	240·0	12·0(12·0)	18·4(22·0)	18·8	12·0	37
20·7	11·1	0		85·1	50·5	64·6	9·8	0	7·7	9·1	38
54·5	59·1	93·0		233·1(322)*	301·5	304·6	21·8	18·4	26·5	21·1	39
(48·4)	(46·6)	(94·0)		(263·0)	.....	.....	(15·6)	.....	.....	.....	40
−2·25	+0·26	+0·23		+0·40(+0·2)*	+0·69	+0·53	−2·4	−2·6	−2·6	−2·6	41
	Long storage has caused considerable change in the HCO_3-CO_3 equilibria on No. 112.			Note the relative high fluoride contents and some sodium sulphate present in waters. Long storage on No. 85 has caused loss of $CaCO_3$ and decrease in hardness and saturation index. *Calculated from field results.			A soft, corrosive water; note high negative saturation index and low pH.				

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Ontario

(In parts per million)

No.												
	Municipality	Ottawa, Ont.										
	Source	Ottawa River										
		Raw water										
	Sampling point	From plant basin			Data supplied by Ottawa Water Works Department—Monthly average of daily samples							
					1948							
					Jan.	Feb.	Mar.	Apr.	May	June	July	
1	Field No.	1A	113A	243A								
2	Laboratory No.	1286A	1419	1611								
3	Date of collection	Dec. 10/46	Apr. 9/47	Aug. 1/47								
4	Storage period (days)	25	2	18								
5	Sampling temperature °C		18·6	21·2	0·56	0·56	0·56	3·9	12·2	19·4	25·0	
6	Test temperature °C	Room	Room	Room	Room	Room	Room	Room	Room	Room	Room	
7	Dissolved oxygen											
8	Carbon dioxide (CO_2)											
9	pH	7·6	7·4	7·1	7·1	7·1	7·2	7·2	7·1	7·3	7·2	
10	Colour	40	40	55	42	40	41	40	36	37	35	
11	Turbidity	4·0	24·0	6·4	13	13	22	20	13	12	10	
12	Suspended matter, dried at 105°C											
13	Suspended matter, ignited at 550°C											
14	Spec. cond. (micromhos at 25°C)				60*	61	65	75	55	56	58	
15	Residue on evaporation, dried at 105°C	78·0	94·5	65·6								
16	Ignition loss at 550°C			25·8								
17	Calcium (Ca)	13·1	14·3	9·1								
18	Magnesium (Mg)	1·5	5·7	3·0								
19	Alkalis—as Na	3·8	3·1	2·9								
20	(Na)											
21	(K)											
22	Manganese (Mn)											
23	Iron (Fe) Total		2·0	0·22								
24	Diss.	0·05										
25	Aluminium (Al)											
26	Sulphate (SO_4)	10·3	16·5	8·4								
27	Chloride (Cl)	1·4	0	0								
28	Nitrite (NO_2)	0	0	0								
29	Nitrate (NO_3)	8·0	3·5	4·9								
30	Fluoride (F)											
31	Boron (B)											
32	Phosphate (PO_4)											
33	Bicarbonate (HCO_3)	34·4	46·4	30·3								
34	Carbonate (CO_3)	0	0	0								
35	Silica (SiO_2) Gravimetric	6·0	9·0	4·4								
36	Colorimetric		5·0	1·8								
					Alkalinity (MeO)							
37	Carbonate hardness as $CaCO_3$, p.p.m.	28·2	38·0	24·8	23	23	26	30	20	25	21	
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	10·7	21·2	10·3								
39	Total hardness as $CaCO_3$, p.p.m.	38·9	59·2	35·1								
40	Soap-consuming power as $CaCO_3$, p.p.m.											
41	Saturation index	−1·2	−1·2	−1·9								
	Remarks:	Note: Raw water has a corrosive tendency. For additional analyses of raw Ottawa River water *see* Part II, page 26.										
		* Specific conductance in micromhos at 20°C.										

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Ontario

(In parts per million)

Ottawa, Ont.																
Ottawa River																
Raw water																
Data supplied by Ottawa Water Works Department—Monthly average of daily samples																No.
1948					1949											
Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
																	1
																	2
																	3
																	4
23·3	19·4	10·6	6·7	1·7	0·56	0·56	0·56	3·9	10·6	18·9	23·0	23·3	17·2	12·8	4·4	1·1	5
Room	Room	Room	Room	Room	Room	Room	Room	Room	Room	Room	Room	Room	Room	Room	Room	Room	6
																	7
																	8
7·3	7·3	7·2	7·2	7·2	7·1	7·2	7·1	7·2	7·2	7·2	7·3	7·3	7·2	7·2	7·2	7·1	9
35	35	33	36	38	44	47	44	43	38	38	36	34	33	39	42	46	10
10	10	11	12	13	12	12	13	23	12	11	11	10	11	13	13	14	11
																	12
																	13
59	61	62	62	61	61	63	64	73	55	54	53	57	59	61	60	61	14
																	15
																	16
																	17
																	18
																	19
																	20
																	21
																	22
																	23
																	24
																	25
																	26
																	27
																	28
																	29
																	30
																	31
																	32
																	33
																	34
																	35
																	36
21	24	24	23	22	22	24	22	27	20	22	20	22	22	25	26	26	37
																	38
																	39
																	40
																	41

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Ontario

(In parts per million)

No.												
	Municipality	Ottawa, Ont.										
	Source	Ottawa River										
		Finished water										
	Sampling point	At town building	City tap at plant	At Mines Building	Data supplied by Ottawa Water Works Department—Monthly average of daily samples							
					1948							
					Jan.	Feb.	Mar.	Apr.	May	June	July	
1	Field No.			543								
2	Laboratory No.	1085	1207	1790								
3	Date of collection	May 26/46	Sept. 24/46	Jan. 8/48								
4	Storage period (days)	2 to 3 days	1	20								
5	Sampling temperature, °C.											
6	Test temperature, °C.	Room	Room	Room								
7	Dissolved oxygen											
8	Carbon dioxide (CO_2)											
9	pH	7·6	8·8	6·7	8·6	8·6	8·4	8·0	8·0	8·3	8·5	
10	Colour				4	4	4	4	4	4	4	
11	Turbidity			6·0								
12	Suspended matter, dried at 105°C.											
13	Suspended matter, ignited at 550°C.											
14	Spec. cond. (micromhos at 25°C)			61·16								
15	Residue on evaporation, dried at 105°C.	78·5	87·0	64·0								
16	Ignition loss at 550°C.			27·4								
17	Calcium (Ca)	17·3	19·0	6·7								
18	Magnesium (Mg)	1·3	3·5	2·7								
19	Alkalis—as Na	4·3	2·9	4·2								
20	(Na)											
21	(K)											
22	Manganese (Mn)											
23	Iron (Fe) Total											
24	Diss.	0·10	0·05	0·25								
25	Aluminium (Al)		0·14									
26	Sulphate (SO_4)	29·6	29·6	11·7								
27	Chloride (Cl)	2·0	1·3	2·3								
28	Nitrite (NO_2)			0								
29	Nitrate (NO_3)		0·56	0·80								
30	Fluoride (F)											
31	Boron (B)											
32	Phosphate (PO_4)											
33	Bicarbonate (HCO_3)	42·7	41·4	38·1								
34	Carbonate (CO_3)	0	8·4	0								
35	Silica (SiO_2) Gravimetric	0·5	1·0	8·0								
36	Colorimetric			5·6								
					Alkalinity (MeO)							
37	Carbonate hardness as $CaCO_3$, p.p.m.	35·0	34·0	27·9								
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	13·5	27·9	0	26	27	29	31	21	27	25	
					Alkalinity (Phenph.)							
39	Total hardness as $CaCO_3$, p.p.m.	48·5	61·9	27·9	3	2	2	0	0	2	3	
40	Soap-consuming power as $CaCO_3$, p.p.m.				Consumption m.g.d.							
41	Saturation index	−0·95	+0·27	−2·3	25·51	27·75	27·10	24·95	23·78	25·40	26·07	
		Finished water adjusted to more positive index at plant by lime addition. Loss of $CaCO_3$ in system may account for wide variation in index. Note differences in hardness also.										

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

OTTAWA RIVER WATERSHED—ONTARIO

(In parts per million)

OTTAWA, ONT.

Ottawa River

Finished water

Data supplied by Ottawa Water Works Department—Monthly average of daily samples

1948					1949												No.
Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
																	1
																	2
																	3
																	4
																	5
																	6
																	7
																	8
8·5	8·6	8·6	8·5	8·7	8·8	8·9	8·9	8·9	8·9	9·0	8·8	8·9	9·0	8·9	8·8	8·9	9
4	4	4	4	3	3	4	4	4	4	4	4	4	3	4	3	3	10
																	11
																	12
																	13
																	14
																	15
																	16
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																	32
																	33
																	34
																	35
																	36
																	37
25	26	26	25	24	25	28	29	33	26	28	26	27	28	29	29	31	38
2	2	2	2	2	2	2	2	3	4	6	4	5	5	4	3	3	39
																	40
25·61	25·88	24·66	23·84	23·22	23·67	24·14	23·99	23·06	23·2	25·6	25·5	25·5	23·3	22·76	22·88	22·13	41

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TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Ontario

(In parts per million)

No.	Municipality	Pembroke, Ont.	Perth, Ont.		Plantagenet, Ont.	Renfrew, Ont.	
	Source	Ottawa River (Allumette Lake)	Tay River		Collecting area, springs	Bonnechère River	
		Raw and finished water	Raw water	Finished water	Raw and finished water	Raw water	Finished water
	Sampling point	Plant tap	Intake pump	Distribution pump	Town tap	From river at plant	From outgoing main at plant
1	Field No.	69	149	148	388	126	127
2	Laboratory No.	1622	2107	2142	3256	2031	2394
3	Date of collection	Aug. 6/47	Sept. 25/47	Sept. 25/47	June 15/49	Sept. 16/47	Sept. 16/47
4	Storage period (days)	19	287	299	28	288	399
5	Sampling temperature °C.	21·4	14·2	15·0	16·5	21·8	22·0
6	Test temperature °C.	Room	Room	Room	24·0	Room	19·5
7	Dissolved oxygen	.....	(9·8)	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	(7·5)	(1·7)	(8·0)	(9·9)	(4·5)	(6·5)
9	pH	6·4(6·6)	8·2(7·9)	8·0(7·1)	7·1(7·0)	8·1(7·5)	8·1(7·3)
10	Colour	45 (35)	29 (45)	27 (20)	25 (35)	32 (40)	25 (35)
11	Turbidity	3·1	Less 7·0	Relatively clear	4·2	(<7)	4·5
12	Suspended matter, dried at 105°C.	.....	.....	.....	4·6	.....	3·6
13	Suspended matter, ignited at 550°C.	.....	.....	.....	0·8	.....	0
14	Spec. cond. (micromhos) at 25°C.	.....	156·9	164·6	103·0	138·2	138·4
15	Residue on evaporation, dried at 105°C.	51·8	103·6	107·8	77·6	95·2	99·4
16	Ignition loss at 550°C.	24·8	17·0	18·2	17·6	38·0	19·0
17	Calcium (Ca)	5·8	22·0	22·6	11·0	17·4	18·0
18	Magnesium (Mg)	2·5	5·3	5·7	3·4	5·2	4·9
19	Alkalis—as Na	2·9	4·9	.....	.....	2·2	.....
20	(Na)	.....	.....	2·0	3·1	.....	3·0
21	(K)	.....	.....	2·0	1·7	.....	1·5
22	Manganese (Mn)	.....	.....	.....	.....	.....	.....
23	Iron (Fe) Total	0·27	.....	.....	0·84	.....	0·12
24	Diss.	.....	0·004	0·03	0·26	0·06	0·04
25	Aluminium (Al)	.....	.....	.....	.....	.....	.....
26	Sulphate (SO_4)	8·9	13·2	20·2	14·2	10·0	14·8
27	Chloride (Cl)	0·9(1·0)	0 (0)	1·4(1·3)	0 (0)	0 (0)	1·0(1·7)
28	Nitrite (NO_2)	.....	.....	.....	.....	.....	.....
29	Nitrate (NO_3)	2·7	6·2	7·9	0·62	3·9	0·08
30	Fluoride (F)	.....	0·30	.....	.....	.....	0·15
31	Boron (B)	.....	.....	.....	.....	.....	.....
32	Phosphate (PO_4)	.....	.....	.....	.....	.....	.....
33	Bicarbonate (HCO_3)	15·6(17·1)	76·4(74·4)	67·6(63·4)	43·9(29·3)	68·3(68·3)	68·3(65·9)
34	Carbonate (CO_3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
35	Silica (SiO_2) Gravimetric	4·8	.....	2·2	11·8	.....	7·6
36	Colorimetric	2·6(4·0)	8·6	4·3	12·0	9·4	6·8(6·0)
37	Carbonate hardness as $CaCO_3$, p.p.m.	12·8(14·0)	62·6(61·0)	55·4(52·0)	36·0(24·0)	56·0(56·0)	56·0(54·0)
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	12·0	14·1	24·5	5·4	8·8	9·0
39	Total hardness as $CaCO_3$, p.p.m.	24·8	76·7	79·9	41·4	64·8	65·0
40	Soap-consuming power as $CaCO_3$, p.p.m.	(17·3)	(70·9)	(70·9)	.....	(55·4)	(58·8)
41	Saturation index	−3·05	−0·03	−0·24	−1·7	−0·24	−0·37
	Remarks:	Note acid pH and corrosivity of water.			Note relatively high iron in comparison with river waters.		

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Ontario

(In parts per million)

Rockcliffe Park, Ont.	Rockland, Ont.		Smiths Falls, Ont.			Swastika, Ont.		Teck Township, Ont.	
Purchased from the City of Ottawa	Ottawa River		Rideau River			Blanche River			
	Raw water	Finished water	Raw water		Finished water	Raw water	Finished water*		
	From river at intakes	At plant filters	Intake pump		Plant tap	From river	Town tap		No.
	387	386	167	150	151	.....	114		1
	3255	3254	1384	2025	2400	.....	2094		2
	June 15/49	June 15/49	Mar. 7/47	Sept. 26/47	Sept. 26/47	Aug. 28/47	Aug. 28/47		3
	28	28	6	252	389	0	307		4
	21·0	21·0	.....	10·8	12·8	.....	21·0		5
	24·0	24·0	Room	Room	19·1	.....	Room		6
	.....	.....	.....	(10·0)	.....	.....	.....		7
	(3·5)	(5·0)	.....	(2·5)	(6·0)	.....	(2·0)		8
	7·0(7·3)	7·2(6·9)	7·5	8·3(7·9)	8·0(7·1)	.....	7·6(7·2)		9
	45 (60)	40 (58)	30	40 (30)	4 (8)	(65)	32 (60)		10
	5·6 (about 5·0)	7·5 (about 5)	0·9	(<7)	0·7	(10)	(9)		11
	5·0	4·0	.....	.....	.....	.....	.....		12
	1·0	0·6	.....	.....	.....	.....	.....		13
	106·0	141·7	.....	179·4	212·1	.....	83·05		14
	57·4	62·2	151·5	110·6	133·6	.....	64·8		15
	23·6	26·4	.....	46·2	27·4	.....	15·0		16
	8·0	6·0	32·9	26·4	28·2	.....	10·8		17
	1·9	2·0	7·2	7·3	6·7	.....	3·0		18
See City of Ottawa	.....	.....	5·0	.....	.....	.....	1·4	*See* Kirkland Lake and Swastika, Ont.	19
	2·3	2·3	.....	.....	2·6	.....	.....		20
	1·1	1·3	.....	.....	1·5	.....	.....		21
	.....	.....	.....	.....	.....	.....	.....		22
	0·32	0·28	0·04	.....	.....	.....	.....		23
	0·13	0·18	.....	0·06	0·04	.....	0·04		24
	.....	.....	.....	.....	.....	.....	.....		25
	10·7	10·9	18·5	10·4	43·1	.....	6·4		26
	0	0	0	0	0·8	.....	1·0		27
	.....	.....	0·01	.....	.....	.....	.....		28
	0·90	0·62	3·5	4·0	0·27	.....	6·2		29
	.....	.....	.....	.....	0·05	.....	.....		30
	.....	.....	.....	.....	.....	.....	.....		31
	.....	.....	0·03	.....	.....	.....	.....		32
	25·9(24·4)	19·5(22·0)	107·8	86·4(87·8)	74·4(68·3)	.....	35·6(36·6)		33
	0 (0)	0 (0)	0	0 (0)	0 (0)	.....	0 (0)		34
	4·0	4·6	3·0	.....	2·8	.....	.....		35
	4·8	5·0	.....	4·0	2·6	.....	9·0		36
	21·2(20·0)	16·0(18·0)	88·4	70·8(72·0)	61·0(56·0)	.....	29·2(30·0)		37
	6·6	7·2	23·3	25·1	36·9	.....	10·1		38
	27·8	23·2	111·7	95·9	97·9	.....	39·3		39
	.....	.....	.....	.....	(87·5)	.....	(31·1)		40
	−2·1	−2·15	−0·39	+0·22	−0·28	.....	−1·2		41

Note change in saturation index on long storage. Some indication of loss of $CaCO_3$ on standing. (*See* sample No. 167).

*Finished water may be a mixture of treated Blanche River water and Kirkland Lake Civic water.

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TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

No.	Municipality	Abord-à-Plouffe, Que.		Aylmer, Que.		Brownsburg, Que.		
	Source	Rivière des Prairies		Lake Deschênes (Ottawa River)		West River		
		Raw water	Finished water	Raw water	Finished water	Raw and finished water		
	Sampling point	At intake	Plant tap	From river at Ottawa	Plant tap	Intake at C.I.L. plant	Intake at C.I.L. plant	Intake at C.I.L. plant
1	Field No	557	554	243A	63	181A	272A	335A
2	Laboratory No	3950	3947	1611	2057	1489	1647	1714
3	Date of collection	Feb. 22/50	Feb. 22/50	Aug. 1/47	Aug. 4/47	May 23/47	Aug. 25/47	Oct. 22/47
4	Storage period (days)	6	.....	18	318	4	21	26
5	Sampling temperature °C	.....	.....	21·1	22·8	13·3	24·4	14·4
6	Test temperature °C	21·2	21·4	Room	Room	Room	Room	Room
7	Dissolved oxygen	.....	.....	.....	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	.....	.....	.....	(13·0)	.....	.....	.....
9	pH	6·9	6·6	7·1	6·7(6·4)	6·8	6·9	7·3
10	Colour	50	20	55	15 (5)	45	25	30
11	Turbidity	3·0	1·0	6·4	Relatively clear	0·7	0·8	1·4
12	Suspended matter, dried at 105°C	.....	.....	.....	.....	.....	.....	.....
13	Suspended matter, ignited at 550°C	.....	.....	.....	.....	.....	.....	.....
14	Spec. cond. (micromhos at 25°C)	93·6	108·2	.....	101·2	.....	.....	61·16
15	Residue on evaporation, dried at 105°C	75·2	80·0	65·6	75·2	38·2	46·4	48·6
16	Ignition loss at 550°C	28·6	18·0	25·8	17·6	.....	25·6	15·4
17	Calcium (Ca)	11·0	13·8	9·1	11·6	4·9	8·7	8·6
18	Magnesium (Mg)	2·4	2·6	3·0	2·6	1·4	1·5	2·8
19	Alkalis—as Na	.....	.....	2·9	3·6	2·3	2·2	1·6
20	(Na)	1·8	1·8	.....	.....	.....	.....	.....
21	(K)	0·8	0·7	.....	.....	.....	.....	.....
22	Manganese (Mn)	.....	.....	.....	.....	.....	.....	.....
23	Iron (Fe) Total	.....	.....	0·22	.....	.....	.....	.....
24	Diss.	0·32	0·06	.....	0·01	0	0·08	0·10
25	Aluminium (Al)	.....	.....	.....	.....	.....	.....	.....
26	Sulphate (SO_4)	17·0	27·3	8·4	26·1	6·3	8·9	7·7
27	Chloride (Cl)	0	0·70	0	0	0	0	0
28	Nitrite (NO_2)	.....	.....	0	.....	0	0	0
29	Nitrate (NO_3)	0·40	0·10	4·9	1·7	2·7	2·2	0·80
30	Fluoride (F)	.....	.....	.....	.....	.....	.....	.....
31	Boron (B)	.....	.....	.....	.....	.....	.....	.....
32	Phosphate (PO_4)	.....	.....	.....	.....	.....	.....	.....
33	Bicarbonate (HCO_3)	32·2	22·4	30·3	24·4(17·1)	15·1	27·8	27·6
34	Carbonate (CO_3)	0	0	0	0 (0)	0	0	0
35	Silica (SiO_2) Gravimetric	7·0	5·2	4·4	.....	3·6	4·2	3·4
36	Colorimetric	4·9	5·2	1·8	13·2(4·0)	4·0	4·4	4·8
37	Carbonate hardness as $CaCO_3$, p.p.m	26·4	18·4	24·8	20·0(14·0)	12·4	22·8	22·6
38	Non-carbonate hardness as $CaCO_3$, p.p.m	10·9	26·7	10·3	19·7	5·5	5·1	10·4
39	Total hardness as $CaCO_3$, p.p.m	37·3	45·1	35·1	39·7	17·9	27·9	33·0
40	Soap-consuming power as $CaCO_3$, p.p.m	.....	.....	.....	(32·0)	.....	.....	.....
41	Saturation index	−2·7	−2·4	−1·7	−2·3	−2·7	−2·1	−1·7
	Remarks:							

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Buckingham, Que.						Cadillac, Que.	Campbell's Bay, Que.	Como, Que.	Crabtree Mills, Que.			Dorion, Que.	
Rivière du Lièvre						Well near town	Ottawa River	Springs in the Rigaud Mountains	Ouareau River			Springs and wells at St. Lazare, Que.	
Raw and finished water						Raw and finished water	Raw and finished water	Raw and finished water	Raw water		Finished water	Raw and finished water	
Direct from intake pipe at plant of Electric Reduction Co., Buckingham.					From tap in Masson, Que.	Town tap	Town tap	Town tap	From river at Rawdon		Town tap	Town tap	No.
171A	393A	433A	484A	676A	374	92	66	5	158A	340A	351	6	1
1479	1785	1832	2015	2429	3214	2362	2056	1519	1466	1720	3127	1517	2
May 20/47	Dec. 12/47	Feb. 12/48	May 12/48	Oct. 12/48	June 8/49	Aug. 18/47	Aug. 5/47	June 17/47	May 13/47	Oct. 27/47	May 13/49	June 17/47	3
2	41	15	20	12	20	422	317	6	7	25	6	6	4
7·9	0·5	1·0	.....	.....	14·9	14·8	19·3	9·5	.....	.....	13·9	10·0	5
Room	Room	Room	Room	22·5	26·3	21·3	Room	Room	Room	Room	20·5	Room	6
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
.....	.....	.....	.....	.....	(2·0)	(9·0)	(5·0)	(3·0)	.....	.....	.....	(4·0)	8
6·8	7·4	6·9	7·0	7·1	7·1(6·7)	7·8(6·9)	7·3(7·0)	7·0(7·2)	6·6	6·8	7·1	7·4(7·1)	9
45	40	40	40	20	23 (40)	0 (<5·0)	38 (40)	5 (5)	35	35	25	15 (15)	10
6·9	2·6	4·4	0·5	3·8	4·4	0·5	Relatively clear	0·25	1·3	6·2	1·1	0·8	11
.....	.....	.....	.....	6·4	.....	.....	.....	.....	.....	.....	.....	.....	12
.....	.....	.....	.....	6·0	.....	.....	.....	.....	.....	.....	.....	.....	13
.....	49·3	43·7	51·6	50·93	68·7	132·8	54·34	.....	.....	31·13	36·0	.....	14
42·0	47·0	42·2	47·2	42·0	.....	100·6	45·6	54·0	29·8	34·2	36·0	67·6	15
.....	16·2	18·0	20·8	13·8	.....	18·0	18·6	7·8	.....	12·4	14·4	19·2	16
5·4	6·4	5·9	6·3	7·4	6·4	13·8	6·8	7·1	2·9	2·6	3·8	9·9	17
1·8	1·8	2·1	1·3	2·2	1·1	4·7	2·5	2·6	1·7	1·1	1·3	2·8	18
2·1	3·2	.....	4·7	.....	.....	.....	0·8	2·7	0·7	2·7	.....	3·5	19
.....	.....	2·0	.....	1·3	1·0	5·3	.....	.....	.....	.....	1·0	.....	20
.....	.....	0·5	.....	1·1	0·5	1·2	.....	.....	.....	.....	0·4	.....	21
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22
0·056	0·17	0·26	0·11	0·45	.....	.....	.....	.....	.....	0·22	.....	0·073	23
.....	.....	.....	.....	0·06	.....	0·056	0·06	0·04	0·01	.....	0·138	.....	24
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25
5·6	6·7	7·6	7·7	9·6	8·3	16·1	9·4	9·6	5·3	5·3	5·6	10·2	26
0	0	0	0	0	2·7	0·5	0	0·1	0	0	0	0	27
0	0	0·07	0	.....	.....	.....	.....	0	0	0	.....	0	28
4·0	1·11	1·33	1·6	0·18	.....	0·93	2·6	3·1	2·2	1·38	0·35	7·1	29
.....	.....	.....	.....	0·15	.....	0·15	.....	.....	.....	.....	0·20	.....	30
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32
13·2	26·6	27·3	17·6	24·4	22·0(14·6)	58·6(53·7)	22·0(19·5)	32·0(31·7)	8·5	12·2	12·0	33·9(32·9)	33
0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)	0	0	0	0 (0)	34
6·0	5·0	5·4	4·2	3·8	.....	15·6	.....	8·8	4·6	6·2	3·6	12·2	35
5·2	5·5	3·0	7·6	3·0	5·0	20·0	9·0	11·6	5·3	6·2	5·7	12·2	36
10·8	21·8	22·4	14·4	20·0	18·0(12·0)	48·0(44·0)	18·0(16·0)	26·2(26·0)	7·0	10·0	9·8	27·8(27·0)	37
10·1	1·6	1·0	6·7	7·6	2·5	5·7	9·3	2·1	7·2	3·5	5·0	8·3	38
20·9	23·4	23·4	21·1	27·6	20·5	53·7	27·3	28·3	14·2	13·5	14·8	36·1	39
.....	.....	.....	.....	.....	(21·8)	(42·1)	.....	(28·5)	.....	.....	.....	(32·9)	40
−2·7	−1·8	−2·3	−2·35	−2·1	−2·1	−0·84	−1·7	−2·1	−3·3	−3·1	−2·8	−1·5	41
Note corrosive tendency of this water and relative high colour.									Note high negative saturation index.				

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

OTTAWA RIVER WATERSHED—QUEBEC

(In parts per million)

No.	Municipality	Dorval, Que.							Dorval, Que.						
	Source	Lake St. Louis							Lake St. Louis						
		Raw water							Finished water						
	Sampling point	At intake		Intake pump—Data from Dorval Water Works					Plant tap		Plant tap—Data from Dorval Water Works				
		—	—	Yearly Averages					—	—	Yearly Averages				
				1942	1943	1944	1945	1946			1942	1943	1944	1945	1946
1	Field No.	14	361						9	360					
2	Laboratory No.		3129							3128					
3	Date of collection	June 18/47	Apr. 23/49						June 18/47	Apr. 23/49					
4	Storage period (days)	Sample lost	26						Sample lost	26					
5	Sampling temperature °C.	19·5		7·2	7·2	7·2	7·2	7·2	15·0		7·2	7·2	7·2	7·2	7·2
6	Test temperature °C.	20·0	20·7						15—17	20·2					
7	Dissolved oxygen														
8	Carbon dioxide (CO_2)	(3·0)				6	7	6	(0·5)		12	10	10	12	12
9	pH	(7·3)	7·2	7·3	7·0	7·0	6·9	6·8	(8·3)	7·3			6·0	5·7	5·8
10	Colour	(55·0)	35	50	55	50	55	55	(5)	0	5	5	5	5	5
11	Turbidity		31·0	20	30	25	30	28	(Clear)	0·1					
12	Suspended matter, dried at 105°C.		42·2												
13	Suspended matter, ignited at 550°C.		34·4												
14	Spec. cond. (micromhos at 25°C)		106·1							160·9					
15	Residue on evaporation, dried at 105°C.		81·6							104·8					
16	Ignition loss at 550°C		23·0							14·2					
17	Calcium (Ca)		13·6							12·8					
18	Magnesium (Mg)		3·8							3·5					
19	Alkalis—as Na														
20	(Na)		2·0							11·5					
21	(K)		1·0							1·0					
22	Managnese (Mn)														
23	Iron (Fe) Total		1·60												
24	Diss.		0·20							0·04					
25	Aluminium (Al)														
26	Sulphate (SO_4)		13·3							37·6					
27	Chloride (Cl)		0							0					
28	Nitrite (NO_2)														
29	Nitrate (NO_3)		0·80							0·71					
30	Fluoride (F)		0·20							0·10					
31	Boron (B)														
32	Phosphate (PO_4)														
33	Bicarbonate (HCO_3)	(32·5)	40·4						(50·0)	43·9					
34	Carbonate (CO_3)	(0)	0						(0)	0					
35	Silica (SiO_2) Gravimetric		5·8							3·6					
36	Colorimetric		6·0							5·6					
37	Carbonate hardness as $CaCO_3$, p.p.m.	(26·0)	38·0	34	30	30	28	36		36·0	30	33	22	30	28
38	Non-carbonate hardness as $CaCO_3$, p.p.m.		11·5	6	8	10	14	4		10·3	10	7	23	12	12
39	Total hardness as $CaCO_3$, p.p.m.		49·5							46·3					
40	Soap-consuming power as $CaCO_3$, p.p.m.	(28·7)		40	38	40	42	40	(26·8)		40	40	45	42	40
41	Saturation index		—1·55							—1·5					
	Remarks:	Note relatively high turbidity in April sample.							Treatment has removed turbidity and colour but has increased sodium and sulphate probably due to alum additions. (No. 360).						

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Fort Coulonge, Que.	Gatineau Mills, Que.						
Ottawa River	Ottawa River						
Raw and finished water	Raw water			Finished water			
				Old plant	New plant	Old plant	
At intake	At plant intake			Plant tap	From filters, no lime	Plant tap	No.
67	28A	41A	91A	29A	42A	92A	1
1620	1306	1326	1370	1307	1327	1371	2
Aug. 5/47	Jan. 9/47	Jan. 24/47	Feb. 13/47	Jan. 9/47	Jan. 24/47	Feb. 13/47	3
20	19	13	12	20	13	12	4
22·5	0·2	0	0·2	2·5	.....	3·0	5
Room	Room	Room	Room	Room	Room	Room	6
(8·0)	.....	.....	.....	.....	.....	.....	7
(2·0)	(1·0)	1·2	3·9	0·9	1·8	1·8	8
6·5(7·2)	7·7(7·7)	7·5	7·1	7·5	4·9	7·6	9
60 (58)	70	80	70	0·3	0·5	0	10
1·3(<7)	3·0	3·0	1·8	1·5	1·5	0·2	11
.....	.....	.....	.....	.....	.....	.....	12
.....	.....	.....	.....	.....	.....	.....	13
.....	.....	.....	.....	.....	.....	.....	14
59·6	65·0	61·0	57·5	78·5	65·0	.....	15
19·8	.....	.....	.....	.....	.....	.....	16
4·1	9·9	10·4	8·2	17·0	10·3	.....	17
1·8	1·7	3·1	1·7	2·6	2·4	.....	18
2·1	0·3	.....	2·0	6·5	2·3	.....	19
.....	.....	.....	.....	.....	.....	.....	20
.....	.....	.....	.....	.....	.....	.....	21
.....	.....	.....	.....	.....	.....	.....	22
0·27	0·02	0·06	0·05	0	0·06	.....	23
.....	.....	.....	.....	.....	.....	.....	24
.....	.....	.....	.....	.....	1·2	0·12	25
6·1	5·8	7·4	6·2	26·7	32·5	21·4	26
0 (0)	0	0	1·4	2·3	0	.....	27
0	0	0	0·001	0	0	.....	28
3·5	3·5	4·4	4·4	3·5	3·5	.....	29
.....	.....	.....	.....	.....	.....	.....	30
.....	.....	.....	.....	.....	.....	.....	31
.....	0	.....	.....	0	.....	.....	32
14·2(12·2)	28·8(29·3)	26·8	24·0	28·7(29·3)	4·9	24·8	33
0 (0)	0 (0)	0	0	0 (0)	0	0	34
4·6	2·0	5·5	0·5	2·0	3·0	.....	35
2·5(4·0)	.....	.....	.....	.....	.....	.....	36
11·6(10·0)	23·6(24·5)	22·0	19·7	23·5(24·0)	4·0	20·3	37
6·1	8·1	16·8	7·8	29·6	31·7	.....	38
17·7	31·7	38·8	27·5	53·1	35·7	.....	39
.....	.....	.....	.....	.....	.....	.....	40
−3·1	−1·2	−1·45	−2·0	−1·2	−4·8	.....	41
High corrosive tendency.				Note increase in sulphates due to alum additions and increased hardness after lime addition.			

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

No.	Municipality	Gracefield, Que.		Grenville, Que.	Hampstead, (Montreal), Que.	Hudson, Que.	Hudson Heights, Que.	Hull, Que.		
	Source	Gatineau River		Springs	Purchased from Montreal	Springs in hills	Springs in hills	Ottawa River		
		Raw and finished water		Raw and finished water	—	Raw and finished water	Raw and finished water	Raw and finished water		
	Sampling point	From river at Paugan Falls		Village tap	—	Town tap	From reservoir overflow	From river	From plant main	From river
1	Field No.	229A	415A	379		3	4	47A	50A	214A
2	Laboratory No.	1596	1809	3226		1520	1518	1333	1337	1567
3	Date of collection	July 15/47	Jan. 17/48	June 9/49		June 17/47	June 17/47	Jan. 31/47	Jan. 30/47	July 1/47
4	Storage period (days)	21	25	19		6	6	10	0	7
5	Sampling temperature °C.	.....	.....	13·0		9·5	8·5	.....	1 to 2	.....
6	Test temperature °C.	Room	Room	27·0		Room	Room	Room	26	Room
7	Dissolved oxygen	.....	.....	.....		(10·0)	.....	.....	.....	.....
8	Carbon dioxide (CO_2)	.....	.....	(5·0)		(2·0)	(4·0)	3·5	(3·7)	.....
9	pH	6·5	6·8	7·4(7·2)		7·1(7·1)	7·1(7·1)	7·2	(7·2)	7·0
10	Colour	45	40	35 (47)		0 about 5	5 (5)	70	(70)	50
11	Turbidity	1·4	3·6	0·7		0·7	0·9	1·2	(1·1)	6·4
12	Suspended matter, dried at 105°C.	.....	.....	.....	*See* Montreal	.....	.....	.....	.....	.....
13	Suspended matter, ignited at 550°C.	.....	.....	.....		.....	.....	.....	.....	.....
14	Spec. cond. (micromhos at 25°C)	.....	34·10	98·5		.....	.....	.....	.....	.....
15	Residue on evaporation, dried at 105°C.	41·0	36·2	65·6		51·8	60·6	72·5	.....	58·2
16	Ignition loss at 550°C.	19·0	16·4	23·2		11·6	10·6	.....	.....	23·4
17	Calcium (Ca)	5·4	4·1	12·4		7·2	7·0	10·6	.....	8·2
18	Magnesium (Mg)	2·3	0·9	2·1		2·7	3·2	2·8	.....	2·4
19	Alkalis—as Na	1·6	4·8	.....		3·5	2·6	0·9	.....	3·1
20	(Na)	.....	.....	2·0		.....	.....	.....	.....	.....
21	(K)	.....	.....	0·5		.....	.....	.....	.....	.....
22	Manganese (Mn)	.....	.....	.....		.....	.....	.....	.....	.....
23	Iron (Fe) Total	0·11	0·19	.....		.....	0·08	0·06	.....	0·41
24	Diss.	.....	.....	0·10		0·03	.....	.....	.....	.....
25	Aluminium (Al)	.....	.....	.....		.....	.....	.....	.....	.....
26	Sulphate (SO_4)	6·8	10·4	9·0		8·9	10·2	11·1	.....	8·4
27	Chloride (Cl)	0	0	0		0·3	1·3	0	.....	0
28	Nitrite (NO_2)	.....	.....	.....		0	0	0	.....	.....
29	Nitrate (NO_3)	1·3	1·3	0·44		3·1	3·5	3·5	.....	1·3
30	Fluoride (F)	.....	.....	.....		.....	.....	.....	.....	.....
31	Boron (B)	.....	.....	.....		.....	.....	.....	.....	.....
32	Phosphate (PO_4)	.....	.....	.....		.....	.....	.....	.....	.....
33	Bicarbonate (HCO_3)	17·6	17·1	43·9(36·6)		31·7(29·3)	32·0(31·7)	31·1	.....	24·2
34	Carbonate (CO_3)	0	0	0 (0)		0 (0)	0 (0)	0	.....	0
35	Silica (SiO_2) Gravimetric	4·2	5·2	6·2		10·8	13·2	0·5	.....	7·4
36	Colorimetric	2·5	4·4	7·6		11·6	13·3	.....	.....	2·7
37	Carbonate hardness as $CaCO_3$, p.p.m.	14·4	14·0	36·0(30·0)		26·0(24·0)	26·2(26·0)	25·5	27·0	19·8
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	8·5	0	3·5		3·0	4·4	12·4	.....	10·5
39	Total hardness as $CaCO_3$, p.p.m.	22·9	14·0	39·5		29·0	30·6	37·9	.....	30·3
40	Soap-consuming power as $CaCO_3$, p.p.m.	.....	.....	.....		(30·3)	(20·0)	.....	.....	.....
41	Saturation index	−2·9	−2·7	−1·25		−2·0	−2·0	−1·7	.....	−2·1
	Remarks:					Note. Hudson and Hudson Heights and Como supply are all same source.		For further analysis of Ottawa River *see* Part II, page 26.		

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Joliette, Que.		Lachine, Que.				Lachute, Que.	L'Annonciation, Que.	La Salle, Que.	
L'Assomption River		Lake St. Louis				Pollock Creek	Mountain lake and streams	Purchased from Lachine, Que.	
Raw water	Finished water	Raw water		Finished water		Raw and finished water	Raw and finished water		
Plant intake	Plant tap	At intake well at plant		At filter plant tap		Town tap	Town tap	—	No.
24	25	15	359	16	358	38	49		1
2055	1877	1529	2885	.....	2886	2398	2061		2
June 25/47	June 25/47	June 20/47	Mar. 16/49	June 20/47	Mar. 16/49	July 5/47	July 10/47		3
356	273	3	16	0	16	472	343		4
20·5	20·5	18·0	2·8	15·0	3·3	18·0	15·8		5
Room	Room	Room	22·0	17·0	21·9	19·1	Room		6
(7·6)	.....	(9·0)	.....	.....	.....	.....	.....		7
(2·5)	(0)	(4·0)	.....	(8·2)	.....	(6·0)	(3·0)		8
8·9(7·2)	8·4(9·5)	7·1(7·6)	7·2	(6·6)	7·0	6·6(6·7)	7·4(6·8)		9
33 (45)	15 (8)	45 (75)	35	(sl.< 5)	7	8 (50)	34 (65)		10
.....	4·4	3·3	3·0	.....	1·0	3·0	(5·0)		11
.....	.....	.....	.....	.....	.....	.....	.....		12
.....	.....	.....	.....	.....	.....	.....	.....	*See* Lachine, Que.	13
45·21	79·86	.....	98·2	.....	125·6	49·50	41·03		14
40·2	68·2	61·4	83·0	.....	87·8	52·0	42·2		15
13·6	17·0	25·4	31·2	.....	21·8	19·6	16·6		16
4·9	10·2	8·7	11·2	.....	17·0	5·6	4·0		17
1·0	1·8	2·8	3·4	.....	3·8	1·4	0·4		18
1·9	.....	2·7	.....	.....	.....	.....	3·2*		19
.....	3·0	.....	2·3	.....	2·3	1·9	.....		20
.....	1·0	.....	1·0	.....	1·0	0·7	.....		21
.....	.....	.....	.....	.....	.....	.....	.....		22
0·07	0·23	0·32	.....	.....	.....	.....	.....		23
.....	.....	.....	0·24	.....	0·08	0·47	0·002		24
.....	.....	.....	.....	.....	.....	.....	.....		25
6·4	14·5	8·9	15·0	.....	30·0	6·8	6·5		26
0	0 (0)	0	1·5	.....	1·9	0·7	0 (0)		27
.....	0·05	0	.....	.....	.....	.....	.....		28
2·2	0·39	1·8	2·22	.....	0·18	0·36	0		29
.....	.....	.....	0·15	.....	0·10	0·24	.....		30
.....	.....	.....	.....	.....	.....	.....	.....		31
.....	.....	.....	.....	.....	.....	.....	.....		32
0 (12·2)	31·5(16·4)	27·8(26·8)	39·0	(17·1)	29·3	19·5(14·6)	14·6(9·8)		33
4·8(0)	0 (5·4)	0 (0)	0	(0)	0	0 (0)	0 (0)		34
.....	8·0	6·6	7·8	.....	5·5	6·8	.....		35
9·4	11·4	3·4	5·6	.....	6·0	3·0(3·5)	14·8		36
8·0(10·0)	25·8(18·0)	22·8(22·0)	32·0	(14·0)	24·0	16·0(12·0)	11·6(8·0)		37
8·4	7·1	10·4	10·0	.....	34·0	3·8	0		38
16·4	32·9	33·2	42·0	.....	58·0	19·8	11·6		39
.....	(30·0)	(30·3)	.....	(33·7)	.....	(18·0)	(10·4)		40
−0·80	−0·51	−1·9	−1·7	.....	−1·8	−2·0	−2·2		41

Note: Sample No. 25 taken at time when excess lime being added. Tests done on the spot immediately showed this water to have pH of 9·5, CO_2—0, with phenolphthalien alkalinity of 4·5, total alkalinity of 18·0 p.p.m. Long storage caused the above change in this regard.

Note increase in sulphates and hardness on treatment.

*Alkalis calculated.

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

No.	Municipality	L'Assomption, Que.	Laurentides (St. Lin, Que.)	Laval des Rapides, Quebec		L'Epiphanie, Que.	Maniwaki, Que.
	Source	L'Assomption River		Rivière des Prairies		Well and small spring	Deep wells
		Raw and finished water		Raw water	Finished water	Raw and finished water	Raw and finished water
	Sampling point	Highway bridge below L'Assomption River		From bridge near Pont Viau	Town tap	Deep well pump	Town tap
1	Field No.	23		13	349	350	56
2	Laboratory No.	2030		1527	3009	2888	2333
3	Date of collection	June 25/47		June 19/47	March 23/49	March 18/49	July 24/47
4	Storage period (days)	345		4	17	14	439
5	Sampling temperature °C.	19·5		17·5	.....	.....	10·3
6	Test temperature °C.	20·0		Room	21·8	22·0	21·9
7	Dissolved oxygen	(7·2)		(9·0)	.....	.....	.....
8	Carbon dioxide (CO_2)	(2·3)		(2·5)	.....	.....	(60·0)
9	pH	7·8(7·2)		6·9(7·4)	7·8	7·6	7·2(5·9)
10	Colour	48 (60)		50	30	28·0	13 (10)
11	Turbidity	(21)		6·3	4·6	3·0	Relatively clear
12	Suspended matter, dried at 105°C.	.....		.....	5·6	.....	.....
13	Suspended matter, ignited at 550°C.	.....	*See* St. Lin, Que.	.....	3·4	.....	.....
14	Spec. cond. (micromhos at 25°C)	57·42		.....	107·8	1303·7	137·5
15	Residue on evaporation, dried at 105°C.	48·4		67·4	82·2	727·2	98·6
16	Ignition loss at 550°C.	15·8		28·0	28·2	96·8	42·0
17	Calcium (Ca)	7·2		9·6	12·2	31·6	10·4
18	Magnesium (Mg)	2·3		2·7	3·3	41·4	2·9
19	Alkalis—as Na	4·0*		2·6	.....	.....	.....
20	(Na)	.....		.....	2·2	180·0	6·5
21	(K)	.....		.....	0·8	14·8	4·0
22	Manganese (Mn)	.....		.....	.....	.....	.....
23	Iron (Fe) Total	.....		0·48	0·14	.....	.....
24	Diss.	0·05		.....	0·09	0·09	0·08
25	Aluminium (Al)	.....		.....	.....	.....	.....
26	Sulphate (SO_4)	4·8		9·9	21·2	8·1	13·0
27	Chloride (Cl)	1·0		0	1·0	211·2	8·6
28	Nitrite (NO_2)	.....		0	.....	.....	.....
29	Nitrate (NO_3)	2·6		3·5	0·35	1·33	12·4
30	Fluoride (F)	.....		.....	0·20	0·60	0·28
31	Boron (B)	.....		.....	.....	.....	.....
32	Phosphate (PO_4)	.....		.....	.....	.....	.....
33	Bicarbonate (HCO_3)	23·2(23·2)		30·7(32·9)	31·2	439·5	31·7(29·3)
34	Carbonate (CO_3)	0 (0)		0 (0)	0	0	0 (0)
35	Silica (SiO_2) Gravimetric	.....		6·8	4·2	22·2	10·2
36	Colorimetric	10·4		3·6	5·2	26·4	12·6(13·0)
37	Carbonate hardness as $CaCO_3$, p.p.m.	19·0(19·0)		25·2(27·0)	25·6	249·1	26·0(24·0)
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	8·4		9·9	18·4	0	11·8
39	Total hardness as $CaCO_3$, p.p.m.	27·4		35·1	44·0	249·1	37·8
40	Soap-consuming power as $CaCO_3$, p.p.m.	(18·5)		(30·3)	.....	.....	(24·2)
41	Saturation index	−1·5		−2·0	−1·1	+0·21	−1·8
	Remarks:	* Alkalis calculated.				Total alkalinity as $CaCO_3$ is 360·0 p.p.m. Note high magnesium - calcium ratio and high chloride.	A soft water, more typical of surface waters than well water.

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Masson, Que.	Montebello, Que.	Mont Laurier, Que.	Montreal, Que.				No.
Purchased from Buckingham, Que.	Echo Lake	Lac Thibeault	St. Lawrence—Ottawa Rivers				
	Raw and finished water	Raw and finished water	Raw water			Finished water	
——	Town tap	Town tap	St. Lawrence River at Cornwall	At intake pump at Montreal	Ottawa River at Dorion	Data from plant records	
	377	52	158	159	160	.....	1
	3250	2059	1375	1376	1377	.....	2
	June 8/49	July 10/47	Feb. 21/47	Feb. 20/47	Feb. 21/47	Av. for Feb. 1947	3
	35	343	4	4	4	.....	4
	14·5	20·0	.....	.....	.....	.....	5
	24·8	Room	Room	Room	Room	Room	6
	.....	.....	.....	.....	.....	.....	7
	(2·9)	(2·2)	3·0	4·5	4·4	5·0	8
	7·0(6·9)	6·8(6·7)	8·0	7·6	7·3	7·6	9
	10 (25)	30 (35)	0	20	55	24	10
	3·0	Relatively clear	1·5	1·4	4·5	<2	11
	.....	.....	.....	.....	.....	.....	12
See Buckingham, Que.	.....	.....	.....	.....	.....	.....	13
	64·0	35·75	.....	.....	.....	.....	14
	32·2	29·4	167·5	133·0	91·5	170·0	15
	11·2	12·8	.....	.....	.....	56·0	16
	4·2	5·0	40·0	29·3	17·9	32·6	17
	0·9	2·4	8·7	6·3	1·3	8·6	18
	.....	1·8*	9·6	10·6	2·8	2·1*	19
	1·3	.....	.....	.....	.....	.....	20
	0·4	.....	.....	.....	.....	.....	21
	.....	.....	.....	.....	.....	.....	22
	.....	.....	0·06	0·08	0·11	0·07	23
	0·08	0	.....	.....	.....	.....	24
	.....	.....	.....	.....	.....	.....	25
	8·6	5·9	23·1	19·3	14·4	31·3	26
	0	0 (0)	17·9	10·4	0	14·0	27
	.....	.....	0	0	0·001	.....	28
	0·44	1·7	3·1	4·0	6·3	.....	29
	0·10	.....	.....	.....	.....	Trace	30
	.....	.....	.....	.....	.....	.....	31
	.....	.....	.....	.....	.....	.....	32
	14·9(9·8)	9·8(7·3)	115·2	85·2	44·0	83·0	33
	0 (0)	0 (0)	0	0	0	0	34
	2·8	.....	1·0	2·5	5·5	5·2	35
	3·0	6·4	.....	.....	.....	.....	36
	12·2(8·0)	8·0(6·0)	94·4	69·8	36·1	68·0	37
	2·0	14·3	41·2	29·2	14·0	48·6	38
	14·2	22·3	135·6	99·0	50·1	116·6	39
	(14·4)	.....	.....	.....	.....	.....	40
	−2·6	−2·9	−0·81	−0·45	−1·15	−0·44	41
	A very soft water.	*Alkalis calculated as Na.	Note: Montreal raw water (159) is apparently a mixture of St. Lawrence River water (158) and Ottawa River (160).			*Alkalis calculated.	

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

OTTAWA RIVER WATERSHED—QUEBEC

(In parts per million)

No.														
	Municipality	MONTREAL, QUE. (Cont'd.)												
	Source	St. Lawrence—Ottawa Rivers												
		Raw water												
	Sampling point	Plant intake—Data supplied by Montreal filtration plant												
		1945												
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av.
1	Field No.													
2	Laboratory No.													
3	Date of collection													
4	Storage period (days)													
5	Sampling temperature °C	0	0	0·6	6·7	10·0	16·1	20·6	21·1	18·3	11·1	6·1	0·6	9·4
6	Air temperature °C	−13·3	−9·4	0·6	6·7	9·4	16·1	18·9	17·8	13·9	6·7	1·7	−7·2	5·0
7	Dissolved oxygen													
8	Carbon dioxide (CO_2)													
9	pH													
10	Colour	33	32	45	51	44	31	21	14	16	33	31	31	32
11	Turbidity	6	5	10	16	14	9	7	8	6	8	8	9	9
12	Suspended matter, dried at 105°C													
13	Suspended matter, ignited at 550°C													
14	Spec. cond. (micromhos at 25°C)													
15	Residue on evaporation, dried at 105°C													
16	Ignition loss at 550°C													
17	Calcium (Ca)													
18	Magnesium (Mg)													
19	Alkalis—as Na													
20	(Na)													
21	(K)													
22	Manganese (Mn)													
23	Iron (Fe) Total													
24	Diss.													
25	Aluminium (Al)													
26	Sulphate (SO_4)													
27	Chloride (Cl)													
28	Nitrite (NO_2)													
29	Nitrate (NO_3)													
30	Fluoride (F)													
31	Boron (B)													
32	Phosphate (PO_4)													
33	Bicarbonate (HCO_3)													
34	Carbonate (CO_3)													
35	Silica (SiO_2) Gravimetric													
36	Colorimetric													
37	Carbonate hardness as $CaCO_3$, p.p.m.													
38	Non-carbonate hardness as $CaCO_3$, p.p.m.													
39	Total hardness as $CaCO_3$, p.p.m.													
40	Soap-consuming power as $CaCO_3$, p.p.m.													
		Percentages, St. Lawrence River based on alkalinities												
41	Saturation index %	45	45	52	59	59	60	73	77	70	66	69	74	62
	Remarks:	Results are based on analyses of monthly samples made up of equal parts of daily samples collected half-hourly.												
		Total water filtered, m.g.d.												
		Chlorination—Demand, p.p.m.												
		Residual, p.p.m.												

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Montreal, Que. (Cont'd).													
St. Lawrence—Ottawa Rivers													
Finished water													
Plant tap—Data supplied by Montreal filtration plant													
1945													No.
Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av.	
													1
													2
													3
													4
													5
													6
													7
													8
7·1	7·1	7·7	7·8	7·8	7·9	7·9	7·8	8·1	7·8	7·9	7·9	7·7	9
29	26	34	37	32	25	12	8	19	22	21	23	24	10
<2	<2	3	4	<2	<2	<2	<2	<2	<2	<2	<2	<2	11
													12
													13
													14
146	154	186	212	206	200	180	178	164	162	156	158	175	15
48	48	76	86	96	82	52	46	44	40	40	40	58	16
27·4	27·2	29·2	31·2	36·6	28·9	39·7	34·9	36·3	27·7	30·9	36·3	32·2	17
10·2	7·5	9·1	9·3	10·6	7·4	7·6	10·6	11·7	11·4	10·1	9·1	9·5	18
													19
													20
													21
													22
0·12	0·09	0·10	0·18	0·14	0·09	0·18	0·14	0·04	0·10	0·06	0·06	0·11	23
													24
													25
21·4	26·3	32·9	28·0	32·1	28·0	37·0	35·4	40·3	42·0	35·4	40·3	33·2	26
12·0	12·0	12·0	13·0	13·0	12·0	14·0	15·0	15·0	14·0	14·0	14·0	13·0	27
													28
													29
													30
													31
													32
68·3	68·3	74·4	83·0	81·7	83·0	95·2	100·0	92·7	89·1	91·5	90·4	85·4	33
0	0	0	0	0	0	0	0	0	0	0	0	0	34
32·8	41·6	34·4	22·4	32·0	26·8	4·4	7·6	4·4	7·2	3·2	5·2	18·5	35
													36
56·0	56·0	61·0	68·0	67·0	68·0	78·0	82·0	76·0	73·0	75·0	79·0	70·0	37
54·5	42·7	49·1	47·9	67·8	34·6	52·5	48·5	62·8	42·9	43·7	49·0	49·5	38
110·5	98·7	110·1	115·9	134·8	102·6	130·5	130·5	138·8	115·9	118·7	128·0	119·5	39
													40
												−0·35	41
157·18	159·36	155·09	152·35	150·56	152·26	153·83	158·39	156·02	151·79	147·98	146·25	153·42	
0·87	0·85	0·81	0·87	0·89	0·91	0·73	0·61	0·61	0·72	0·65	0·62	0·76	
0·21	0·21	0·21	0·20	0·20	0·20	0·20	0·20	0·20	0·20	0·21	0·21	0·20	

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

No.														
	Municipality	Montreal, Que. (Cont'd.)												
	Source	St. Lawrence—Ottawa Rivers												
		Finished water												
	Sampling point	Plant tap—Data supplied by Montreal filtration plant												
		1946												
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av.
1	Field No.													
2	Laboratory No.													
3	Date of collection													
4	Storage period (days)													
5	Sampling temperature °C.													
6	Test temperature °C.													
7	Dissolved oxygen													
8	Carbon dioxide (CO_2)	(Max. 3·00 —— Min. 1·0)				3·0	2·4	2·6	1·0	2·0	3·0	2·0	2·7	
9	pH	7·8	7·8	7·7	7·8	7·8	7·8	7·6	7·9	7·9	7·8	7·7	7·8	7·8
10	Colour	22	22	26	20	17	19	10	7	7	13	24	35	19
11	Turbidity	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
12	Suspended matter, dried at 105°C.													
13	Suspended matter, ignited at 550°C.													
14	Spec. cond. (micromhos at 25°C)													
15	Residue on evaporation, dried at 105°C.	170	156	164	160	188	176	196	192	172	162	162	166	172
16	Ignition loss at 550°C.	36	36	42	44	54	52	50	50	40	34	30	26	41
17	Calcium (Ca)	34·0	34·0	36·0	35·4	32·5	34·0	34·3	34·0	33·3	31·7	34·9	34·9	34·1
18	Magnesium (Mg)	8·3	7·4	10·8	8·9	8·9	7·7	10·4	9·3	7·5	8·2	7·6	9·0	8·7
19	Alkalis—as Na													
20	(Na)													
21	(K)													
22	Manganese (Mn)													
23	Iron (Fe) Total	0·07	0·06	0·08	0·09	0·06	0·05	0·03	0·03	0·05	0·05	0·05	0·08	0·06
24	Diss.													
25	Aluminium (Al)													
26	Sulphate (SO_4)	37·0	34·6	42·0	37·0	39·5	30·4	27·2	32·9	25·5	28·0	36·9	40·3	34·3
27	Chloride (Cl)	13·0	13·0	13·0	13·0	14·0	13·0	15·0	16·0	16·0	15·0	14·0	15·0	14·0
28	Nitrite (NO_2)													
29	Nitrate (NO_3)													
30	Fluoride (F)													Tr.
31	Boron (B)													
32	Phosphate (PO_4)													
33	Bicarbonate (HCO_3)	89·1	86·6	84·2	91·5	89·1	84·2	97·6	96·4	91·5	87·8	87·4	86·6	89·1
34	Carbonate (CO_3)	0	0	0	0	0	0	0	0	0	0	0	0	0
35	Silica (SiO_2) Gravimetric	4·8	5·2	5·2	6·4	3·2	3·2	4·8	2·8	2·4	2·8	1·6	4·4	3·9
36	Colorimetric													
37	Carbonate hardness as $CaCO_3$, p.p.m.	73·0	71·0	69·0	75·0	73·0	69·0	80·0	79·0	75·0	72·0	70·0	71·0	73·0
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	46·1	44·5	65·5	50·0	45·2	47·6	48·4	44·0	39·1	41·0	48·3	53·1	47·8
39	Total hardness as $CaCO_3$, p.p.m.	119·1	115·5	134·5	125·0	118·2	116·6	128·4	123·0	114·1	113·0	118·3	124·1	120·8
40	Soap-consuming power as $CaCO_3$, p.p.m.													
41	Saturation index													−0·19
	Remarks:	Daily average chlorination—Demand, p.p.m. .... 0·78 Residual, p.p.m. .... 0·25												

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Montreal, Que. (Cont'd).

St. Lawrence—Ottawa Rivers

Finished water

Plant tap—Data supplied by Montreal filtration plant

1947													No.
Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av.	
													1
													2
													3
													4
													5
													6
													7
6·0	5·0	5·0	5·0	4·3	5·2	3·0	2·2	2·4	3·9	4·0	4·0	4·2	8
7·7	7·6	7·6	7·6	7·5	7·5	7·6	7·8	7·7	7·6	7·6	7·5	7·6	9
26	24	22	30	38	33	23	12	9	15	19	20	23·7	10
<2	<2	<2	5·0	<2	<2	<2	<2	<2	<2	<2	<2	<2	11
													12
													13
													14
158	170	182	160	136	146	168	184	192	178	190	190	171	15
44	56	40	46	86	82	86	86	82	98	96	90	74	16
33·4	32·6	33·2	29·7	23·4	24·3	29·4	35·2	35·7	33·2	34·0	34·6	31·6	17
8·0	8·6	5·9	7·9	7·0	9·2	11·4	8·7	8·0	6·0	6·0	6·1	7·7	18
													19
													20
													21
													22
0·06	0·07	0·05	0·12	0·10	0·07	0·05	0·07	0·05	0·05	0·06	0·06	0·067	23
													24
													25
36·2	31·3	36·0	39·5	30·4	35·6	28·8	26·3	26·3	23·2	28·0	28·0	30·8	26
12·0	14·0	13·0	10·0	11·0	11·0	14·0	17·0	17·0	15·0	16·0	16·0	14·0	27
													28
													29
												Tr.	30
													31
													32
81·7	83·0	80·5	75·6	63·4	65·9	83·0	96·4	96·4	89·1	90·3	93·9	83·0	33
0	0	0	0	0	0	0	0	0	0	0	0	0	34
3·2	5·2	4·0	6·8	4·4	4·8	3·2	2·0	5·2	4·8	4·4	4·4	4·4	35
													36
67·0	68·0	66·0	62·0	52·0	54·0	68·0	79·0	79·0	73·0	74·0	77·0	68·0	37
49·6	48·6	41·3	44·6	35·3	44·4	52·2	44·7	42·9	34·6	35·8	34·6	42·6	38
116·6	116·6	107·3	106·6	87·3	98·4	120·2	123·7	121·9	107·6	109·8	111·6	110·6	39
													40
												−0·46	41

Daily average chlorination— Demand, p.p.m..... 0·88
Residual, p.p.m..... 0·26

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

OTTAWA RIVER WATERSHED—QUEBEC

(In parts per million)

No.								
	Municipality	MONTREAL, QUE.—(Cont'd.)						
	Source	St. Lawrence—Ottawa Rivers						
		Finished water						
	Sampling point	Plant tap—Data supplied by Montreal filtration plant						
		1948						
		Jan.	Feb.	Mar.	Apr.	May	June	July
1	Field No.							
2	Laboratory No.							
3	Date of collection							
4	Storage period (days)							
5	Sampling temperature °C.							
6	Test temperature °C.							
7	Dissolved oxygen							
8	Carbon dioxide (CO_2)	5·0	6·0	5·0	5·3	4·0	5·0	4·0
9	pH	7·5	7·5	7·4	7·5	7·5	7·7	7·8
10	Colour	20	24	29	32	21	17	11
11	Turbidity	<2	<2	<2	<2	<2	<2	<2
12	Suspended matter, dried at 105°C.							
13	Suspended matter, ignited at 550°C.							
14	Spec. cond. (micromhos at 25°C)							
15	Residue on evaporation, dried at 105°C.	174	160	168	170	160	166	192
16	Ignition loss at 550°C.	88	82	88	90	96	92	94
17	Calcium (Ca)	27·2	24·9	33·7	32·0	31·2	33·4	33·4
18	Magnesium (Mg)	6·9	8·7	7·3	6·7	6·9	7·4	7·0
19	Alkalis—as Na							
20	(Na)							
21	(K)							
22	Manganese (Mn)							
23	Iron (Fe) Total	0·04	0·05	0·06	0·08	0·07	0·04	0·04
24	Diss.							
25	Aluminium (Al)							
26	Sulphate (SO_4)	29·6	30·4	28·0	26·3	28·0	28·8	28·8
27	Chloride (Cl)	15·0	14·0	13·0	12·0	14·0	14·0	17·0
28	Nitrite (NO_2)							
29	Nitrate (NO_3)							
30	Fluoride (F)	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.
31	Boron (B)							
32	Phosphate (PO_4)							
33	Bicarbonate (HCO_3)	89·1	81·7	83·0	79·3	80·5	89·1	95·2
34	Carbonate (CO_3)	0	0	0	0	0	0	0
35	Silica (SiO_2) Gravimetric	4·0	3·2	3·2	3·6	2·8	3·2	2·8
36	Colorimetric							
37	Carbonate hardness as $CaCO_3$, p.p.m.	73·0	67·0	68·0	65·0	66·0	73·0	78·0
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	23·2	30·0	46·4	42·6	40·2	41·1	34·3
39	Total hardness as $CaCO_3$, p.p.m.	96·2	97·0	114·4	107·6	106·2	114·1	112·3
40	Soap-consuming power as $CaCO_3$, p.p.m.							
41	Saturation index							
	Remarks:							

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Montreal, Que.—(Cont'd)										
St. Lawrence—Ottawa Rivers										
Finished water										
Data supplied by Montreal filtration plant						Plant tap				No.
1948						1949				
Aug.	Sept.	Oct.	Nov.	Dec.	Av.	Jan.	Feb.	Mar.	Apr.	
										1
										2
										3
										4
										5
										6
										7
3·0	3·0	3·0	3·0	3·0	4·1	5·0	4·0	4·0	4·0	8
7·9	7·8	7·7	7·7	7·6	7·6	7·5	7·5	7·5	7·5	9
9	9	11	13	19	18	17	22	21	35	10
<2	<2	<2	<2	<2	<2	<2	<2	<2	3	11
										12
										13
										14
188	166	148	156	156	167	174	156	158	160	15
92	60	70	78	76	84	80	72	82	78	16
31·2	33·2	33·5	33·5	32·6	31·7	31·2	28·9	29·5	26·9	17
7·4	6·8	6·9	6·8	6·7	7·1	6·8	6·2	6·0	5·6	18
										19
										20
										21
										22
0·06	0·10	0·14	0·10	0·12	0·075	0·13	0·10	0·11	0·32	23
										24
										25
28·8	20·6	18·9	21·4	20·6	25·9	23·9	28·8	32·1	26·3	26
17·0	17·0	16·0	15·0	16·0	15·0	14·0	15·0	13·0	11·0	27
										28
										29
Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	30
										31
										32
92·7	90·3	90·3	90·3	86·6	87·8	83·0	76·9	78·1	70·8	33
0	0	0	0	0	0	0	0	0	0	34
2·4	17·2	2·4	2·4	2·4	4·1	3·2	2·8	2·0	4·0	35
										36
76·0	74·0	74·0	74·0	71·0	72·0	68·0	63·0	64·0	58·0	37
32·3	36·9	37·9	37·6	38·1	36·3	37·8	34·6	34·4	32·1	38
108·3	110·9	111·9	111·6	109·1	108·3	105·8	97·6	98·4	90·1	39
										40
					−0·43					41

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TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

No.	Municipality	Montreal East, Que.	Montreal North, Que.	Montreal West, Que.	Mount Royal, Que.	Noranda, Que.	
	Source	Water purchased from Montreal	Water purchased from Montreal	Water purchased from Montreal	Water purchased from Montreal	Lake Dufault	
						Raw water	Finished water
	Sampling point					At plant pump	Plant tap
1	Field No.					88	89
2	Laboratory No.					2089	2063
3	Date of collection					Aug. 15/47	Aug. 15/47
4	Storage period (days)					320	307
5	Sampling temperature °C.					21·7	21·9
6	Test temperature °C.					Room	Room
7	Dissolved oxygen					.....	.....
8	Carbon dioxide (CO_2)					(2·0)	(0)
9	pH					7·0(6·9)	7·0(9·6)**
10	Colour					11 (40)	17 (15)
11	Turbidity					Relatively clear	Relatively clear
12	Suspended matter, dried at 105°C.					.....	.....
13	Suspended matter, ignited at 550°C.					.....	.....
14	Spec. cond. (micromhos at 25°C)					107·5	139·5
15	Residue on evaporation, dried at 105°C.	*See* Montreal	*See* Montreal	*See* Montreal	*See* Montreal	73·2	92·0
16	Ignition loss at 550°C.					10·2	14·6
17	Calcium (Ca)					9·2	16·4
18	Magnesium (Mg)					2·6	3·6
19	Alkalis—as Na					5·7*	5·3*
20	(Na)					.....	.....
21	(K)					.....	.....
22	Manganese (Mn)					.....	.....
23	Iron (Fe) Total					0·20	0
24	Diss.					.....	.....
25	Aluminium (Al)					.....	.....
26	Sulphate (SO_4)					34·1	39·3
27	Chloride...(Cl)					0	0
28	Nitrite (NO_2)					.....	.....
29	Nitrate (NO_3)					2·6	2·6
30	Fluoride (F)					.....	.....
31	Boron (B)					.....	.....
32	Phosphate (PO_4)					.....	.....
33	Bicarbonate (HCO_3)					5·4(8·5)	17·1(9·8)
34	Carbonate (CO_3)					0 (0)	0 (4·8)
35	Silica (SiO_2) Gravimetric					.....	.....
36	Colorimetric					5·2	7·0
37	Carbonate hardness as $CaCO_3$, p.p.m.					4·4(7·0)	14·0(16·0)
38	Non-carbonate hardness as $CaCO_3$, p.p.m.					29·3	41·8
39	Total hardness as $CaCO_3$, p.p.m.					33·7	55·8
40	Soap-consuming power as $CaCO_3$, p.p.m.					(32·9)	(45·0)
41	Saturation index					−2·7	−2·0
	Remarks:					**High pH is due to low pumping rate and excessive lime addition at time of sampling. *Alkalis calculated as Na.	

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Notre Dame de Liesse, Que.	Outremont, Que.	Papineauville, Que.	Point aux Trembles, Que.	Pointe Claire, Que.		Pointe Gatineau, Que.	Pont Viau, Que.	Rawdon, Que.	
Water purchased from Montreal	Water purchased from Montreal	Springs in hills	Purchased from Montreal	Lake St. Louis		Gatineau River	Artesian well	Creeks in nearby hills	
		Raw and finished water		Raw water	Finished water	Raw and finished water	Raw and finished water	Raw and finished water	
		Town tap			Plant tap	Direct from river at 6-foot depth near intake	At pump	Town tap	No.
		376			8	373	353	35	1
		3228			1525	3218	3010	2062	2
		June 8/49			June 18/47	June 2/49	March 21/49	June 30/47	3
		20			5	26	19	353	4
		14·9			16·0	16·5	.....	19·4	5
		27·0			Room	25·2	21·6	Room	6
		.....			.....	(9·9)	.....	.....	7
		(2·4)			(1·0)	(1·5)	.....	(8·0)	8
		7·8(7·4)			7·8(8·7)	7·3(7·3)	7·6	7·5(6·8)	9
		2 (<5)			20 (20)	35 (55)	0	21 (35)	10
		0·5			2·2	4·0(<7)	0·4	Relatively clear	11
		.....			.....	.....	.....	.....	12
		.....			.....	.....	.....	.....	13
		189·0			.....	63·70	891·8	48·51	14
See Montreal	*See* Montreal	107·4			95·8	.....	590·0	42·8	15
		38·0			30·2	.....	101·0	10·6	16
		26·0			19·2	7·4	124·4	7·2	17
		1·9	*See* Montreal	*See* Dorval, Que. for type of raw water.	3·1	1·3	22·6	1·1	18
		.....			0·8	.....	.....	0·7	19
		2·2			.....	1·0	28·0	.....	20
		0·8			.....	0·6	3·0	.....	21
		.....			.....	.....	.....	.....	22
		.....			0·22	.....	.....	.....	23
		0·08			.....	.....	0·07	0·01	24
		.....			.....	.....	.....	.....	25
		14·2			28·3	8·6	149·3	3·2	26
		0			0	1·6	56·4	0 (0)	27
		.....			0	.....	.....	.....	28
		8·9			3·1	.....	0·35	0·80	29
		0			.....	.....	0·05	.....	30
		.....			.....	.....	.....	.....	31
		.....			.....	.....	.....	.....	32
		74·4(70·8)			37·1(35·4)	26·8(22·0)	295·2	24·4(18·3)	33
		0 (0)			0 (0)	0 (0)	0	0 (0)	34
		6·4			6·0	.....	11·6	.....	35
		8·8			4·4	4·9	13·8	17·2	36
		61·0(58·0)			30·4(29·0)	22·0(18·0)	242·0	20·0(15·0)	37
		11·7			30·3	1·8	161·4	2·5	38
		72·7			60·7	23·8	403·4	22·5	39
		(68·8)			(51·9)	.....	.....	.....	40
		−0·26			−0·78	−1·8	+0·56	−1·7	41
		Note high Ca/Mg ratio.				For additional analyses on Gatineau River *see* Part I, Table III.	Note scaling tendency, i.e. a positive saturation index.	Turbidity in water at time of sampling due to repairs under way on system.	

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TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

No.	Municipality	Rigaud, Que.				Rivière des Prairies, Que.	Rouyn, Que.
	Source	Wells and springs				Purchased from city of Montreal	Purchased from Noranda, Que.
		Raw and finished water	Provincial analyses supplied by town				
	Sampling point	Springs (town tap)	Reservoir water (wells)		Spring No. 1 (Grand Basson)	Spring No. 2 (Petit Basson)		
1	Field No.	61						
2	Laboratory No.	2397						
3	Date of collection	July 28/47	April /37	April /47				
4	Storage period (days)	449						
5	Sampling temperature °C.	15·0						
6	Test temperature °C.	19·4						
7	Dissolved oxygen							
8	Carbon dioxide (CO_2)	(10·0)						
9	pH	8·1(7·2)	7·55	7·45	7·4	7·4		
10	Colour	4 (10)	7		15	6		
11	Turbidity	1·3	4		3	3		
12	Suspended matter, dried at 105°C.							
13	Suspended matter, ignited at 550°C.							
14	Spec. cond. (micromhos at 25°C)	133·4					*See* Montreal	*See* Noranda
15	Residue on evaporation, dried at 105°C.	82·0						
16	Ignition loss at 550°C.	15·8						
17	Calcium (Ca)	14·4						
18	Magnesium (Mg)	5·7						
19	Alkalis—as Na							
20	(Na)	2·6						
21	(K)	0·8						
22	Manganese (Mn)							
23	Iron (Fe) Total		0	0	0	0		
24	Diss.	0·04						
25	Aluminium (Al)							
26	Suplhate (SO_4)	17·5						
27	Chloride (Cl)	0 (0)						
28	Nitrite (NO_2)							
29	Nitrate (NO_3)	0·08	0					
30	Fluoride (F)	0·30						
31	Boron (B)							
32	Phosphate (PO_4)							
33	Bicarbonate (HCO_3)	75·6(73·2)						
34	Carbonate (CO_3)	0 (0)						
35	Silica (SiO_2) Gravimetric	7·8						
36	Colorimetric	7·8						
37	Carbonate hardness as $CaCO_3$, p.p.m.	59·3						
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	0						
39	Total hardness as $CaCO_3$, p.p.m.	59·3						
40	Soap-consuming power as $CaCO_3$, p.p.m.	(51·9)	183·0	183·0	32·0	100·0		
41	Saturation index	−0·43						
	Remarks:							

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Saraguay, Que.	Senneville, Que.	Shawville, Que.	St. Agathe des Monts, Que.	Ste. Anne de Bellevue, Que.			
Purchased from city of Montreal	Purchased from Ste. Anne de Bellevue, Que.	Springs	Petit Lac des Sables	Ottawa River			
		Raw and finished water	Raw and finished water	Raw water		Finished water	
		Village tap	Town tap	Ottawa River at Dorion	Ottawa River at canal at Ste. Anne	At distribution pump	No.
		65	40	2	208A	7	1
		2060	2058	1516	1561	1526	2
		Aug. 4/47	July 7/47	June 17/47	June 25/47	June 18/47	3
		318	346	6	7	5	4
		13·5	19·2	18·5	.....	17·0	5
		Room	Room	Room	Room	Room	6
		.....	(6·6)	(8·6)	.....	(8·9)	7
		(6·0)	(4·0)	(1·0)	.....	(3·5)	8
		7·8(7·65)	6·8(5·2)	7·1(7·5)	7·0	7·0(7·0)	9
		10 (sl. <5)	25 (20)	55 (60)	45	50 (52)	10
		Clear	Clear	3·0	5·7	6·3	11
		.....	.....	.....	.....	.....	12
		.....	.....	.....	.....	.....	13
See Montreal	*See* Ste. Anne de Bellevue	406·9	29·70	.....	.....	.....	14
		253·0	23·4	65·0	63·0	66·8	15
		44·4	12·2	23·0	21·0	26·2	16
		64·8	3·8	8·3	7·6	8·6	17
		17·7	0·9	2·4	3·0	3·2	18
		9·5*	0·4*	3·5	2·1	3·1*	19
		.....	.....	.....	.....	.....	20
		.....	.....	.....	.....	.....	21
		.....	.....	.....	.....	.....	22
		.....	.....	0·51	0·45	0·62	23
		0·002	0·002	.....	.....	.....	24
		.....	.....	.....	.....	.....	25
		23·5	5·4	10·5	10·0	8·7	26
		4·4(4·2)	0	0	0	0·7	27
		.....	.....	(Tr.)	0	0	28
		1·70	0·80	2·2	2·2	1·8	29
		.....	.....	.....	.....	.....	30
		.....	.....	.....	.....	.....	31
		.....	.....	.....	.....	.....	32
		209·8(207·4)	7·3(4·9)	29·3(31·7)	27·1	25·9(25·6)	33
		0 (0)	0 (0)	0 (0)	0	0 (0)	34
		.....	.....	6·4	7·6	10·0	35
		28·0	4·6	4·2(3·5)	4·2	5·2	36
		172·0(170·0)	6·0(4·0)	24·0(26·0)	22·2	21·2(21·0)	37
		62·6	7·2	6·5	9·1	13·4	38
		234·6	13·2	30·5	31·3	34·6	39
		.....	(12·1)	(32·0)	.....	.....	40
		+0·65	−3·1	−1·9	−2·1	−2·1	41
		*Alkalis calculated.	*Alkalis calculated. Note very bigh corrosive tendency indicated by saturation index.	*Alkalis calculated as Na. For additional analyses of raw river water at Ste. Anne Canal, see Part II, on surface waters of Ottawa River basin.			

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

No.	Municipality	Ste. Anne des Plaines, Que.	St. Eustache, Que.	St. Félix de Valois, Que.	St. Henri de Mascouche, Que.	St. Jean de Dieu, Que.	St. Jérôme, Que.
	Source	Deep wells	Deep wells and springs	Drainage basin—springs	Springs	Purchased from Montreal, Que.	Springs and wells
		Raw and finished water	Raw and finished water	Raw and finished water	Raw and finished water		Raw and finished water
	Sampling point	Direct from pumps	Town tap	Town tap	Town tap		Plant tap—wells
1	Field No.	524	357	356	354		20
2	Laboratory No.	3593	3053	2882	2883		1878
3	Date of collection	Nov. 25/49	Mar. 26/49	Mar. 21/49	Mar. 21/49		June 24/47
4	Storage period (days)	8	21	11	11		274
5	Sampling temperature °C.	5	6·7	.....	.....		11·0
6	Test temperature °C.	20	24·0	21·9	21·9		Room
7	Dissolved oxygen	.....	.....	.....	.....		(10·5)
8	Carbon dioxide (CO_2)	.....	.....	.....	.....		(9·5)
9	pH	7·7	8·0	6·9	7·7		7·7 (7·0)
10	Colour	20	0	0	5		15 (<5)
11	Turbidity	4·6	0·8	1·5	0		4·7
12	Suspended matter, dried at 105°C.	2·6	.....	.....	.....		.....
13	Suspended matter, ignited at 550°C.	1·0	.....	.....	.....		.....
14	Spec. cond. (micromhos at 25°C)	668·3	700·3	63·0	99·11		76·01
15	Residue on evaporation, dried at 105°C.	438·6	403·8	65·8	68·0		67·2
16	Ignition loss at 550°C.	75·0	83·8	12·6	30·6		19·6
17	Calcium (Ca)	65·0	46·8	10·0	9·0		7·2
18	Magnesium (Mg)	25·8	23·3	3·1	3·3		2·0
19	Alkalis—as Na	.....	.....	.....	.....		.....
20	(Na)	47·0	66·0	1·8	2·3		4·0
21	(K)	11·2	3·6	2·2	1·3		0·5
22	Manganese (Mn)	.....	.....	.....	.....	*See* Montreal	.....
23	Iron (Fe) Total	0·17	.....	.....	.....		.....
24	Diss.	0·05	0·15	0·07	0·25		0·02
25	Aluminium (Al)	.....	.....	.....	.....		.....
26	Sulphate (SO_4)	58·3	53·0	9·1	11·7		7·6
27	Chloride (Cl)	34·5	60·2	2·3	1·7		0
28	Nitrite (NO_2)	.....	.....	.....	.....		0·05
29	Nitrate (NO_3)	7·1	1·3	7·19	3·54		1·33
30	Fluoride (F)	0·25	0·25	0·05	0·10		.....
31	Boron (B)	.....	.....	.....	.....		.....
32	Phosphate (PO_4)	.....	.....	.....	.....		.....
33	Bicarbonate (HCO_3)	329·4	270·8	14·7	43·9		39·0(28·1)
34	Carbonate (CO_3)	0	0	0	0		0 (0)
35	Silica (SiO_2) Gravimetric	23·0	9·4	8·0	11·8		8·0
36	Colorimetric	19·2	13·2	10·4	12·6		16·4
37	Carbonate hardness as $CaCO_3$, p.p.m.	268·4	212·5	12·0	36·0		26·2(23·0)
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	0	0	25·7	0		0
39	Total hardness as $CaCO_3$, p.p.m.	268·4	212·5	37·7	36·0		26·2
40	Soap-consuming power as $CaCO_3$, p.p.m.	.....	.....	.....	.....		(26·0)
41	Saturation index	+0·10	+0·52	−2·4	−1·2		−1·3
	Remarks:			Note higher nitrate content and variation in Na/K ratio.			

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

OTTAWA RIVER WATERSHED—QUEBEC

(In parts per million)

ST. JOVITE, QUE.	ST. LÉONARD, QUE.	ST. LIN, QUE. (Laurentides, Que.)		ST. PAUL L'ERMITE, QUE.				No.
Lake Duhamel	Purchased from city of Montreal	L'Achigan River and well		Ouareau and L'Assomption Rivers				
Raw and finished water		Raw and finished water		Raw water			Finished water	
Town tap		From L'Achigan River	Town tap, well water	Ouareau River near St. Jacques, Que.	L'Assomption River at L'Assomption	L'Assomption River at Joliette	Plant tap	
41		26	355	34	23	461A	347	1
2017		2078	2880	2029	2030	1931	2826	2
July 7/47		June 26/47	Mar. 16/49	June 29/47	June 25/47	Mar. 30/48	Mar. 4/49	3
330		362	13	346	345	22	5	4
10·2		20·8	20·0	24	19·5	.....	.....	5
Room		Room	20·0	Room	Room	20·0	19·0	6
.....		(8·5)	.....	(7·6)	(7·2)	.....	.....	7
(4·0)		(1·8)	.....	(2·0)	(2·3)	.....	.....	8
7·9(5·8)		7·7(7·4)	8·5	7·4(7·4)	7·8(7·2)	6·6	7·4	9
30 (20)		30 (50)	5	38 (45)	48 (60)	30	0	10
0·1		(<7)	0·2	Clear	(21·0)	4·0	1·6	11
.....		.....	.....	.....	.....	.....	.....	12
.....		.....	.....	.....	.....	.....	.....	13
25·85		54·89	397·0	32·45	57·42	46·64	136·9	14
19·0		45·2	238·8	30 8	48·4	62·4	91·6	15
7·0		15·0	50·8	11·8	15·8	21·0	23·0	16
2·6		5·6	56·0	3·2	7·2	8·5	14·8	17
1·0	*See* Montreal	1·4	11·6	1·8	2·3	1·5	3·3	18
1·8		4·1*	.....	3·8*	4·0*	.....	.....	19
.....		.....	13·0	.....	.....	2·0	5·8	20
.....		.....	3·2	.....	.....	1·0	1·0	21
.....		.....	.....	.....	.....	.....	.....	22
.....		.....	.....	.....	.....	0·64	.....	23
0·03		0·10	0·13	0·14	0·05	.....	0·05	24
.....		.....	.....	.....	.....	.....	.....	25
4·9		6·0	26·7	5·0	4·8	7·4	28·5	26
0·4		0 (0)	3·2	1·0	1·0	3·0	5·0	27
0		— (0·001)	.....	.....	.....	0	.....	28
0·90		3·10	0·09	0·90	2·6	1·8	0·89	29
.....		.....	0·05	.....	.....	.....	0·05	30
.....		.....	.....	.....	.....	.....	.....	31
.....		.....	.....	.....	.....	.....	.....	32
8·8(2·4)		24·4(15·9)	215·2	12·4(12·2)	23·2(23·2)	16·6	34·2	33
0 (0)		0 (0)	4·6	0 (0)	0 (0)	0	0	34
1·8		.....	12·2	.....	.....	12·2	7·4	35
2·6		10·8	12·6	7·4	10·4	5·6	8·2	36
6·4(2·0)		19·7(13·0)	184·0	10·2(10·0)	19·0(19·0)	13·6	28·0	37
4·2		0	3·4	5·2	8·4	13·9	22·5	38
10·6		19·7	187·4	15·4	27·4	27·5	50·5	39
.....		(20·8)	.....	(11·2)	.....	.....	.....	40
−2·2		−1·6	+1·0	−2·3	−1·5	−2·8	−1 4	41
Soft water, corrosive		*Alkalis calculated as Na. Apparently well being used. No. 355.		* Alkalis calculated as Na.				

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

No.	Municipality	Ste. Rose, Que.		Ste. Rose West, Que.	Ste. Thérèse de Blainville, Que.	St. Vincent de Paul, Que.		
	Source	Wells and Rivière des Mille Iles		Purchased from Ste. Rose	Wells and springs	Rivière des Prairies		
		Raw water	Finished water	——	Raw and finished water	Raw water		Finished water
	Sampling point	Rivière des Mille Iles at Ste. Rose	Plant tap (mixture)	——	Plant tap	Rivière des Prairies near Ste. Dorothée		Town tap
1	Field No.	18	19		27	155A	383A	348
2	Laboratory No.	2028	1879		1888	1463	1774	2841
3	Date of collection	June 23/47	June 23/47		June 26/47	May 13/47	Nov. 24/47	Mar. 9/49
4	Storage period (days)	347	275		272	7	53	8
5	Sampling temperature °C.	20·0	20·0		9·8	.....	.....	.....
6	Test temperature °C.	Room	Room		Room	Room	Room	22·7
7	Dissolved oxygen	(8·5)	.....		.....	.....	.....	.....
8	Carbon dioxide (CO_2)	(3·5)	(14·0)		(11·0)	.....	.....	.....
9	pH	4·1(7·3)	7·7(6·4)		8·2(7·5)	6·5	7·2	6·7
10	Colour	34 (52)	15 (12)		20 (<5)	45	50	10
11	Turbidity	.....	4·4		1·6	6·1	8·1	3·0
12	Suspended matter, dried at 105°C.	.....	.....	*See* Ste. Rose	.....	.....	.....	3·4
13	Suspended matter, ignited at 550°C.	.....	.....		.....	.....	.....	0·8
14	Spec. cond. (micromhos at 25°C)	121·4	176·0		723·6	.....	75·13	123·7
15	Residue on evaporation, dried at 105°C.	80·2	123·4		448·8	63·2	71·6	91·4
16	Ignition loss at 550°C.	15·6	24·4		109·4	.....	23·2	31·0
17	Calcium (Ca)	8·8	20·2		65·6	8·3	9·2	15·2
18	Magnesium (Mg)	3·1	5·0		24·2	3·1	2·7	3·1
19	Alkalis—as Na	5·6*	.....		.....	2·1	3·5	.....
20	(Na)	.....	5·0		49·0	.....	.....	2·3
21	(K)	.....	0·5		5·0	.....	.....	0·8
22	Manganese (Mn)	.....	.....		.....	.....	.....	.....
23	Iron (Fe) Total	0·10	0·14		.....	0·12	0·54	0·35
24	Diss.	.....	.....		0·14	.....	.....	0·08
25	Aluminium (Al)	.....	.....		.....	.....	.....	.....
26	Sulphate (SO_4)	16·5	49·4		75·2	9·5	11·5	30·6
27	Chloride (Cl)	0	2·5		59·1	0	0	4·4
28	Nitrite (NO_2)	.....	0·05		0	0	0	.....
29	Nitrate (NO_3)	2·2	0·62		0·89	2·2	1·33	0·27
30	Fluoride (F)	.....	.....		.....	.....	.....	0·10
31	Boron (B)	.....	.....		.....	.....	.....	.....
32	Phosphate (PO_4)	.....	.....		.....	.....	.....	.....
33	Bicarbonate (HCO_3))	0 (26·8)	36·8(29·3)		280·6(275·7)	26·6	31·7	21·0
34	Carbonate (CO_3)	0 (0)	0 (0)		0 (0)	0	0	0
35	Silica (SiO_2) Gravimetric	.....	7·4		9·0	8·6	7·8	4·6
36	Colorimetric	7·8	9·0		7·6	5·5	3·9	4·4
37	Carbonate hardness as $CaCO_3$, p.p.m.	0 (22·0)	30·2(24·0)		230·0(226·0)	21·8	26·0	17·2
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	34·7	40·8		33·2	11·7	8·1	33·5
39	Total hardness as $CaCO_3$, p.p.m.	34·7	71·0		263·2	33·5	34·1	50·7
40	Soap-consuming power as $CaCO_3$, p.p.m.	(27·2)	(60·0)		.....	.....	.....	.....
41	Saturation index	.....	−0·82		+0·94	−2·6	−1·8	−2·3
	Remarks:	*Na calculated. Sample No. 18 apparently contaminated in bottle. Note low pH and no carbonate or hicarbonate; field determinations are more accurate. Percentage of well and river water in tap (No. 19) unknown, hut usually 50% each source.			Note relatively high sodium content.			

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

Timiskaming, Que.			Terrebonne, Que.	Thurso, Que.	Verdun, Que.	
Gordon Creek			Springs and wells	Blanche River	Purchased from Montreal	
Raw water		Finished water	Raw and finished water	Raw and finished water		
Gordon Creek at Timiskaming	Gordon Creek at Kipawa	Town tap	Town tap	River at intake		No.
79	257A	80	29	375		1
2042	1629	2095	1889	3249		2
Aug. 11/47	Aug. 11/47	Aug. 11/47	June 27/47	June 8/49		3
305	18	324	271	35		4
22·3	.....	21·0	9·0	15·5		5
Room	Room	Room	Room	24·7		6
(7·6)	.....	.....	.....	(9·1)		7
(3·5)	.....	(6·0)	(5·0)	(2·4)		8
6·5(6·5)	6·3	6·9(6·1)	8·0(7·2)	7·4(7·6)		9
30 (30)	25	26 (20)	35 (37)	20 (30)		10
(<7)	0·3	(<7)	3·9	3·8		11
.....	.....	.....	.....	5·8		12
.....	.....	.....	.....	1·6		13
35·64	.....	35·53	67·76	127·0		14
31·6	32·6	34·2	59·4	54·2		15
10·8	11·4	10·0	19·6	14·8		16
3·2	3·0	3·6	7·8	10·1		17
0·8	1·7	0·7	2·5	1·6		18
6·6*	2·2	1·5*	.....	.....		19
.....	.....	.....	3·0	1·7	*See* Montreal	20
.....	.....	.....	0·5	0·7		21
.....	.....	.....	.....	.....		22
.....	.....	.....	0·25	0·48		23
0·04	0	0·01	.....	0·08		24
.....	.....	.....	.....	.....		25
13·0	8·7	8·3	8·7	11·2		26
0 (0)	0	0·5	0 (0)	0		27
.....	0·025	.....	0	.....		28
2·60	2·2	0·40	0·62	0·53		29
.....	.....	.....	.....	0·15		30
.....	.....	.....	.....	.....		31
.....	.....	.....	.....	.....		32
12·2(8·1)	6·8	6·6(5·5)	33·7(30·5)	34·2(31·7)		33
0 (0)	0	0 (0)	0 (0)	0 (0)		34
.....	2·2	.....	12·0	2·4		35
4·4	3·8	7·0	8·2	5·0(5·5)		36
10·0(6·6)	5·6	5·4(4·5)	27·6(25·0)	28·0(26·0)		37
1·3	8·9	6·5	2·2	3·9		38
11·3	14·5	11·9	29·8	31·9		39
(10·4)	.....	(10·4)	(29·8)	(28·8)		40
−3·3	−3·8	−3·1	−1·0	−1·5		41

*Alkalis calculated as Na. Note high negative saturation index.

TABLE XII—Continued

Chemical Analyses of Civic Water Supplies

Ottawa River Watershed—Quebec

(In parts per million)

No.	Municipality	Ville Marie, Que.	Ville St. Laurent, Que.	Ville St. Michel, Que.	Ville St. Pierre, Que.	Westmount, Que.
	Source	Springs	Supplied by city of Montreal	Supplied by city of Montreal	Supplied by city of Montreal	Supplied by city of Montreal
		Raw and finished water				
	Sampling point	Town tap				
1	Field No.	83				
2	Laboratory No.	2334				
3	Date of collection	Aug. 12/47				
4	Storage period (days)	420				
5	Sampling temperature °C	16·0				
6	Test temperature °C	22·1				
7	Dissolved oxygen	.....				
8	Carbon dioxide (CO_2)	(3·7)				
9	pH	7·9(7·4)				
10	Colour	12 (About 5)				
11	Turbidity	(Clear)				
12	Suspended matter, dried at 105°C	.....	*See* Montreal	*See* Montreal	*See* Montreal	*See* Montreal
13	Suspended matter, ignited at 550°C	.....				
14	Spec. cond. (micromhos) at 25°C	83·82				
15	Residue on evaporation, dried at 105°C	77·2				
16	Ignition loss at 550°C	21·6				
17	Calcium (Ca)	10·8				
18	Magnesium (Mg)	2·5				
19	Alkalis—as Na	.....				
20	(Na)	2·0				
21	(K)	0·7				
22	Manganese (Mn)	.....				
23	Iron (Fe) Total	0·40				
24	Diss.	.....				
25	Aluminium (Al)	.....				
26	Sulphate (SO_4)	9·4				
27	Chloride (Cl)	0 (0)				
28	Nitrite (NO_2)	.....				
29	Nitrate (NO_3)	0				
30	Fluoride (F)	0·25				
31	Boron (B)	.....				
32	Phosphate (PO_4)	.....				
33	Bicarbonate (HCO_3)	50·0(46·4)				
34	Carbonate (CO_3)	0 (0)				
35	Silica (SiO_2) Gravimetric	11·0				
36	Colorimetric	10·2				
37	Carbonate hardness as $CaCO_3$, p.p.m.	37·2(38·0)				
38	Non-carbonate hardness as $CaCO_3$, p.p.m.	0				
39	Total hardness as $CaCO_3$, p.p.m.	37·2				
40	Soap-consuming power as $CaCO_3$, p.p.m.	(37·4)				
41	Saturation index	−0·87				
	Remarks:					

TABLE XII—Concluded

Chemical Analyses of Civic Water Supplies.

St. Lawrence River Watershed—Quebec
(For comparison)

(In parts per million)

Longueuil, Que.			Montreal South, Que.	St. Lambert, Que.				No.
St. Lawrence River			Purchased from city of Longueuil, Que.	St. Lawrence River				
Raw water	Finished water			Raw water		Finished water		
Plant intake	Plant tap			River near plant	At intake pump	Plant tap		
490A	11	175		10	363	12	362	1
2329	1524	1847		1528	2887	.....	2884	2
Feb. 6/48	June 19/47	Feb. 2/48		June 19/47	Mar. 17/49	June 19/47	Mar. 17/49	3
238	4	27		5	15	0	15	4
.....	16·5	.....		16·0	.....	15·5	.....	5
24·4	Room	Room		Room	21·9	(16·0)	21·9	6
.....	.....	.....		(8·0)	.....	.....	.....	7
.....	(18·5)	.....		(2·5)	.....	(9·0)	.....	8
8·4	6·9(6·7)	7·8		7·9(7·9)	7·9	(7·2)	7·6	9
14	10 (About 5)	10		40 (60)	40	(5)	0	10
0·8	0·1(Clear)	1·5		9·6	0·8	(Clear)	0	11
.....	.....	.....	*See* Longueuil	.....	.....	.....	.....	12
.....	.....	.....		.....	.....	.....	.....	13
302·6	.....	293·5		.....	281·3	.....	283·7	14
.....	174·0	175·6		181·2	167·8	.....	161·0	15
.....	64·2	53·6		70·4	47·2	.....	23·2	16
40·5	32·8	37·9		33·8	37·2	.....	34·0	17
9·6	7·4	8·5		7·8	8·2	.....	7·9	18
.....	7·5*	.....		6·4	.....	.....	.....	19
8·7	.....	8·0		.....	7·7	.....	7·5	20
1·6	.....	1·5		.....	1·2	.....	1·2	21
.....	.....	.....		.....	.....	.....	.....	22
.....	0·07	.....		0·73	.....	.....	.....	23
.....	.....	0·07		.....	0·07	.....	0·03	24
.....	.....	.....		.....	.....	.....	.....	25
.....	45·8	30·2		23·7	26·0	.....	28·2	26
17·5	14·8	18·3		9·9	17·6	.....	18·0	27
.....	0	0		0	.....	.....	.....	28
.....	2·20	0·44		3·5	0·35	.....	0·35	29
.....	.....	.....		.....	0·15	.....	0·10	30
.....	.....	.....		.....	.....	.....	.....	31
.....	.....	.....		.....	.....	.....	.....	32
112·2	68·3(65·9)	122·2		101·3(97·6)	112·4	(83·0)	105·0	33
2·4	0 (0)	0		0 (0)	0	(0)	0	34
.....	4·6	3·6		9·6	4·0	.....	1·6	35
7·4	2·8	1·6		2·9	3·6	.....	1·2	36
96·0	56·0(54·0)	100·2		83·0(80·0)	92·0	(68·0)	86·0	37
44·7	56·3	29·5		33·4	34 6	(15·0)	31·3	38
140·7	112·3	129·7		116·4	126·6	.....	117·3	39
.....	.....	.....		.....	.....	(83·0)	.....	40
+0·62	−1·2	+0·63		0	−0·02	.....	−0·40	41

For further analyses on St. Lawrence River at Longueuil *see* Table IX, pages 28-29

*Alkalis calculated as Na.

APPENDIX A

SURFACE WATER SAMPLING LOCATIONS

OTTAWA RIVER DRAINAGE BASIN

(*See also* Figure 6)

APPENDIX A—Concluded

SURFACE WATER SAMPLING LOCATIONS—Concluded

OTTAWA RIVER DRAINAGE BASIN—*Continued*

(*See also* Figure 6)

APPENDIX B

MUNICIPAL SUPPLIES STUDIED WITHIN THE OTTAWA RIVER DRAINAGE BASIN

(*See* Part III and Figure 6)

APPENDIX B—Concluded

MUNICIPAL SUPPLIES STUDIED WITHIN THE OTTAWA RIVER DRAINAGE BASIN—Concluded

(*See* Part III and Figure 6)

CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

MINES BRANCH

FIGURE 6

MAP OF THE

OTTAWA RIVER WATERSHED

SHOWING

CIVIC WATER SUPPLIES AND LOCATIONS OF SAMPLING STATIONS

Scale: 1 Inch to 16 Miles = $\frac{1}{1{,}013{,}760}$

16 0 16 32 48

LEGEND

Civic Supplies	Sampling Stations
Total Hardness as ppm $CaCO_3$	Monthly Sampling ..... ◆
0 – 60 ..... ○	Spot Sampling ..... ◇
61 – 120 ..... ⊙	
121 – 180 ..... ◑	
Over 180 ..... ●	

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