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LA THÈSE A ÉTÉ
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THE ECONOMIC DEVELOPMENT OF THE EASTERN ONTARIO
REGION: AN HISTORICAL ANALYSIS

by

Amrik Singh Rakhra

Presented in partial fulfilment of
the requirements for the degree of
Doctor of Philosophy

to

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ABSTRACT

The thesis is a study of economic development in the planning region of Eastern Ontario which comprises parts of three distinct physiographic regions: the Ottawa Valley, the St. Lawrence Lowlands, and the Pre-Cambrian Shield. It attempts to identify and analyze the forces that have determined the Region's economic growth or lack of growth since its early settlement. Changes in the Region's economy are compared with those in the other regions of Southern Ontario.

The study of the development of the Region is divided into three sub-periods: (1) from early settlement to 1851, (2) 1851-1901, and (3) 1901 to the present. Each of these periods corresponds approximately to a distinct phase of the structure of the economy. Within each period, the history of the main sectors of the Region's economy is analyzed.

This sectoral analysis indicates that basically the external demand for the Region's rich natural resources combined with natural waterways, which made these resources accessible, was the major force in the economic evolution of the Region. Shifts in technology, movement of farming and forest frontiers, and changes in the policies of the various governments were other factors in the growth or the lack of growth of the Region. The explanatory power of these forces has varied among various sub-periods.

In the first period, the growth of the Region was initiated by the British government's policy of establishing garrisons and by the settlement of the Bay of Quinte and Kingston areas by the Loyalists. The early growth was further stimulated by transshipment activities on the St. Lawrence, British demand for square timber and the development of the internal technology of cutting and rafting square timber, which made the exploitation

of the forest resources possible. Various linkages transmitted spread and multiplier effects to other sectors of the Region. Some of the spread effects, however, leaked out of the Region, owing to the foreign sources of demand for natural resources and the nature of the staple in demand. The Region enjoyed a period of relative prosperity as compared with other regions of Southern Ontario, but the economy failed to translate spread effects into a process of sustainable industrialization.

In the second period, external demand for forest resources continued to dominate the development of the Region. Though British demand for square timber was falling as a result first of reduction and then of elimination of preferential duties, American demand for sawn lumber and various farm products offset to a great extent the decline in square-timber exports. Exhaustion of the white pine forests and the movement of the forest frontier out of the Region brought the rapid growth of the Region to an end at the end of the period. However, diversification of agriculture in the St. Lawrence Lowlands to dairying and livestock farming due to American demand, offset some of the decline in the growth rates of other sectors of the Region.

At the close of this period, the Region had lost some of its natural advantages over other regions with a shift in technology from the wood, wind, and water phase to the steel, steam and coal age. Commercial use of steam power rendered it unnecessary to locate plants near waterfalls. The arrival of railroads made it no longer necessary for plants to be near the markets or near the sources of raw materials. These changes in technology favoured Toronto which had already established its commercial, financial, and market dominance over Ontario. Furthermore, the frontier of settlement too had moved westward. Consequently, the Region lagged behind the other regions

of Southern Ontario, which continued to grow rapidly.

In the third period, the propulsive power of the external demand and virgin resources came to an end. The Region no longer produces any major export staple; consequently the situation of "no staple", "no growth" (or at least low growth) seems to apply.

The technology of hydro-electric power generation gave the Region some new advantages, but they could not equal the industrial advantages of Central Ontario, nor did the rise of the pulp and paper industry compensate for the decline of sawmilling and disappearance of the square-timber trade. The invention of the internal combustion engine did not confer any special advantage on the Region, while the opening of the St. Lawrence Seaway destroyed the Region's important transshipment activity.

The government sector accounts for a large part of the total employment and the gross value of total output of the Region. It dominates the structure of the Ottawa Valley. However, it is not an engine of economic growth for the Region as a whole. Tourism and recreation also contribute greatly to the economy of the Region.

The Region suffers not only from a slow growth rate as compared to other regions of Ontario, but also from "leakages" in multiplier and spread effects owing to the lack of inter-industry linkages among the manufacturing industries in the various spatial units of the Region. Consequently, the growth effects generated in the Region are spilled over abroad and to other regions of Southern Ontario, especially to Central Ontario.

The single theory that can best explain the pattern of economic change of the Region is the staple export thesis, as it is the key to the initial process of growth and subsequent stagnation. However, the metropolis-

hinterland framework (another aspect of the staple thesis) is also relevant. Eastern Ontario's loss of ground to Central and Western Ontario indicates that the idea of cumulative causation may also be applicable. However, no single theory of development can explain the development of the Region over all the three periods. The rapid growth of the Region up to 1851 was based on geographical, technological and historical factors which have since changed. Retardation of the Region's rate of growth since the fourth quarter of the 19th century is due to new historical, geographical and technological factors which it is impossible to reverse. There seems to be little chance of restoring the Region to its former pre-eminence, based on natural resources. A framework based on the development of human resources is needed to explain the present growth process of the Region which is greatly dependent on the government sector.

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CHAPTER I

Introduction

This thesis is concerned with the development of the Eastern Ontario Region which is one of the three planning regions of Southern Ontario and five planning regions of Ontario as a whole.¹ It encompasses the Regional Municipality of Ottawa-Carleton and the counties of Dundas, Frontenac, Glengarry, Grenville, Hastings, Lennox and Addington, Lanark, Leeds, Prescott, Prince Edward, Renfrew, Russell and Stormont.²

The Region, thus, covers the eastern portion of the Province of Ontario from Hastings County in the west to the Quebec border in the northeast and the American border in the southeast. This definition of the Region differs from the definition of the economic region of Eastern Ontario given by Camu, et al.,³ and used until recently by Statistics

¹The five planning regions of Ontario as defined by the Ontario Ministry of Treasury, Economics and Intergovernmental Affairs are: Eastern Ontario, Central Ontario, Western Ontario, Northeastern Ontario, and Northwestern Ontario. See Gill Gillespie, Design for Development, Eastern Ontario Planning Region, A Status Report (Toronto: Regional Planning Branch, 1974).

²Ibid.; and Ontario, Ministry of Treasury, Economics and Intergovernmental Affairs, Design for Development, Prospects for the Eastern Ontario Region (Toronto: Regional Planning Branch, 1972).

³P. Camu, E. P. Weeks, and Z.W. Sametz, Economic Geography of Canada with an Introduction to a 68-Region System (Toronto: Macmillan of Canada, 1964). This study classified Ontario as having ten economic regions. These regions were defined after extensive study of structural, functional, marketing, and production characteristics and were "suitable for general theoretical analysis such as studies of area income and expenditure because of the provision for both production and marketing factors, and for input-output analyses because of the attention paid to industrial relationships" (p. 265).

Canada.¹ The planning region of Eastern Ontario (hereafter called Eastern Ontario) is bigger than the economic region as defined by Camu *et al.*, as it also includes the counties of Hastings, Prince Edward, and Lennox and Addington.

Eastern Ontario has long been regarded as a stagnant or lagging region of Southern Ontario. Several policy papers relating to options for future development of the Region were prepared in the 1970's by the government of Ontario as a basis for designing a development strategy for the Region so as to enable it to realize its growth potential and to narrow the gap between its growth rate and the growth rates of other regions of Southern Ontario.² Despite various development and planning efforts by governments at various levels, Eastern Ontario is still growing slowly as compared with other regions of Southern Ontario.

This thesis is a study of the past development of the Region, undertaken to give a better understanding of the forces that have led to the growth or stagnation of the Region. It may, therefore, help the decision-maker and the planner in designing and planning future development strategy for the Region.³ The thesis, however, will not make any attempt to formulate such development strategy.

Eastern Ontario includes parts of three distinct physiographic regions, i.e., the Ottawa Valley, the St. Lawrence Lowlands, and the Pre-Cambrian Shield. (Details of these physiographic regions are provided later). The thesis

¹In 1978, Statistics Canada began collecting and publishing data on the basis of the five planning regions of Ontario instead of the 10 economic regions defined by Camu *et al.* The shift from economic region to planning region took place on the Ontario Government's realization that economic regions, though useful for analytical purposes, are inadequate for planning purposes. Larger units were required for designing plans related to economic and social activities of the Province.

²See footnotes 1 and 2 on page 1.

³To the writer's knowledge, there has been no comprehensive study in the past that has tried to explain historically the development process of the Region as such.

will examine historically whether there is enough homogeneity or functional integration among the three distinct sub-regions to make it useful to include them within one planning unit.

The history of the economic development of the Region is traced within the framework of all Southern Ontario. The growth rates of the Region are compared with those of other planning regions of Southern Ontario, enabling us to determine when the Region began lagging behind the other regions of Southern Ontario.

The thesis will also examine and analyze the various forces that have determined the economic development of the Region since its early settlement. Do these forces fit into the framework of any single approach to economic development?

This research has necessitated the preparation of historical economic series on some sectors of the three regions of Southern Ontario. These series can be linked to the series recently started and published by Statistics Canada.

The history of the economic development of the Region might have been studied in either of the following two ways: (1) selecting the major sectors of the economy of the Region and discussing changes in them from the days of early settlement to the present, or (2) dividing the study period into various sub-periods and then discussing the growth of the various sectors separately in each period. This study chose the second path. The reasons for the choice are twofold. First, the period covered by the study is more than 150 years. It will be more manageable to examine this long span of development by dividing it into sub-periods. Second, the division into three sub-periods will enable the reader to make comparisons of the different growth patterns of the Region over the three sub-periods.

The sub-periods into which the whole study has been divided are:

(1) From early settlement to 1851, (2) 1851-1901, and (3) 1901 to the present.

The line of demarcation between them is not clear cut as it is based on many overlapping economic, political, and technological factors. Technological changes (e.g., the shift on a massive scale from direct-drive water power to steam power, and the arrival of railroads), political decisions such as the abrogation of imperial preferences (1846), and the signing and abrogation of the Reciprocity Treaty (1854-1866); the decline of the timber trade with Britain and the rise of the lumber trade with the United States, made it necessary to group the effects of these developments in the second period in order to determine their impact on the Region's economy.

A secondary reason for the division is availability of data.

Detailed census statistics became available with the Census of 1851. It was, therefore, considered appropriate to include the year 1851 in the first period to understand the economic structure of the Region at the end of the first period.

The basis of the division between the second period and the third period is also a fundamental change in the structure of the Region's economy, caused by the exhaustion of the pineries, the invention of the internal combustion engine, commercial use of hydroelectric power, the rise of the pulp and paper industry, and the rapid expansion of the government sector.

In each of the above periods, the growth of the Region (measured by the growth of employment, value added, and population) is analysed for various sectors, e.g., transportation, forestry, agriculture, manufacturing, government, settlement (in the nineteenth century), population and urban growth, and tourism (in the twentieth century).

Population growth (especially in the early development of an economy) is considered a good thing as it leads to higher demand for manufactured goods and other services and housing.¹ It is used as a proxy for economic growth in the absence of other economic indicators.

Delineation of the Eastern Ontario Planning Region

"What is a region? I had trouble enough with ecosystems, and I admit I can't find much of a definition of regions either. I went back to Richard Hartshorn (sic) and he tells me that the region is essentially what you want it to be. You can have regions of all kinds and for all purposes."²

There are still two fundamental problems confronting regional economics: (1) What is a region? Is it a real or artificial unit? (2) How should regions be classified? Although there is considerable disagreement over the definition of a region, a widely-held view is that the term denotes primarily a device for the purpose of studying or dealing with some portion of the earth's surface. Let the purpose change and the region will change with it.³

It is a popular belief that regions are artificial designations, not natural objects. A region is neither self-determined nor nature-given. "It is ... an entity for the purpose of thought created by the selection of certain features that are relevant to an areal interest or problem by the disregard of all features that are considered irrelevant."⁴

¹Population is also a source of labour supply, which is not considered by the thesis.

²Graham 1966, p. 133. No full reference is given by a source in which this quotation is cited, viz., A.Z. Guttenberg, "Classifying Regions: A Conceptual Approach," International Regional Science Review, Vol. 2, No. 1, (Fall, 1977), p. 1.

³Ibid., p. 2.

⁴D. Whittlesey, "Regional Concept and the Regional Method," in American Geography, Inventory, and Prospect, P. James and C. Jones (eds.), (Syracuse: University of Syracuse Press, 1954), p. 30.

In the literature, different criteria have been used to delineate regions, viz., homogeneity, internal interdependence, polarization, planning and programming, functional basis, and stage of economic development.¹ The definition of the planning region of Eastern Ontario seems to have been based on administrative and political factors. The delineation of a region by political or administrative considerations may not be arbitrary; it may be identical with that given by the criteria of homogeneity and internal interdependence. This does not seem to be the case for Eastern Ontario. Here the planning authorities felt that "planning regions" more aptly reflected the scope of the design for a development program, than "economic regions". Though they recognized that economic regions were useful for analytical purposes, they decided that they (economic regions) were not adequate for planning purposes.²

The system of regions based on political boundaries, though simple to understand and easy to administer, and also easy to get data for, may not match the economic region, and reduce the effectiveness of development programs.³ If

¹For a detailed discussion of the classification of regions on the basis of these criteria, see: Horst Seibert, Regional Economic Growth: Theory and Policy (Scranton, Pennsylvania: International Text Book Company, 1969), pp. 1-23; J-R. Boudeville, Problems of Regional Economic Planning (Edinburgh: Edinburgh University Press, 1966), pp. 1-21; P. Camu, et al., op. cit., pp. 259-374; A.Z. Guttenberg, op. cit., pp. 1-23; Michel Boisvert, The Correspondence Between the Urban System and the Economic Base of Canada's Regions (Ottawa: Economic Council of Canada, 1978), pp. 28-33; and Michael Ray, "Urban Growth and the Concept of Functional Region," in N.H. Lithwick, and G. Paquet, Urban Studies (Toronto: Methuen, 1968), pp. 40-91.

²Gill Gillespie, op. cit., p. 2.

³According to Lithwick, the persistent existence of income disparities in Canada is in part due to the lack of correspondence between economic regions and political regions. See N.H. Lithwick, "Matching the Political and Economic Regions," Financial Post (March 3, 1979), p. 8.

the lack of equivalence between economic and political regions can reduce the effectiveness of development policies, why then is this study concerned with a planning region? The answer lies with the purpose. One of the purposes of this study is to compare the development of Eastern Ontario with the other planning regions of Southern Ontario, and thus the wise course seemed to be to follow the definition of the Region established by the Ontario Government. Also adoption of the economic region instead of the planning region of Eastern Ontario would have involved two provincial governments (i.e., Ontario and Quebec) and, thus, might have created data problems.

Description of the Region

Physiography and Geology

The Eastern Ontario Region is physiographically heterogeneous. It consists of 15 physiographic units.¹ These minor units can be broadly grouped into three major distinct sub-regions: the Pre-Cambrian Shield and fringes, the St. Lawrence Lowlands, and the Ottawa Valley. The Pre-Cambrian Shield area covers about 60 per cent of the Region. It has good potential for recreation and forest resources, but hardly any fertile land for commercial crops,² as a large part of this area consists of ancient rocks like granite.

The St. Lawrence Lowlands sub-region contains clay plains and till plains, the larger part of which is suitable for farming, and a small proportion of which is suitable for perennial forage crops such as hay and pasture. The Ottawa Valley sub-region contains clay plains, a large

¹For a detailed analysis of these units, see L. Chapman, and B.F. Putnam, The Physiography of Southern Ontario (Toronto: University of Toronto Press, 1966), pp. 173-368.

²Estimated from the map Canada Land Inventory, Soil Capability for Agriculture, Ontario, South Part, (Ottawa: Environment Canada, N.D.).

part of which is good for crop and dairy farming.¹ It also has some soil suitable for forestry, which ranges from with "moderate limitation" to "severe limitation" for the growth of commercial forests.

Although minerals and mining do not at present contribute significantly to the economy of Eastern Ontario, they were of some economic importance during the last century and early part of the present century.² The chief mineral products included: iron, gold, silver, nickle, mica, graphite, building stone, clay for bricks and tiles, shell-marl, and lime and peat. Most of the mines of the above minerals were closed down after a few years because of uneconomic operations resulting from dwindling resources. Currently, in all, there are five mines in operation: a uranium mine in Bancroft, an iron ore mine in Marmora in Hastings County and three mines in the Trenton-Belleville area producing repheline, syenite, and roofing granules.

Population

The population of the Region, according to the 1971 Census, stood at 1,070,916, which represented about 14 per cent of the population of Ontario (according to the 1976 Census, it was 1,120,422). The intraregional distribution of population is very uneven; half the population is concentrated in the Regional Municipality of Ottawa-Carleton. In comparison with other regions of Southern Ontario, Eastern Ontario still has a high proportion of rural residents with a large number of them working on farms. The eastern-most counties (along the Quebec border) have a high proportion of French-speaking

¹ Estimated from Physiography of Southern Ontario, Eastern Portion, map accompanying L.J. Chapman, and D.F. Putnam, op. cit.

² R.W. Ellis, Geological Survey of Canada, Report on the Geology of a Portion of Eastern Ontario. (Ottawa: Printer to the King's Most Excellent Majesty, 1904), pp. 5J-79J.

people, making the Region something like Canada as a whole.

Income Disparities

The Region suffers not only from interregional income disparities (i.e., in relation to incomes of other regions of Ontario), but also intra-regional income disparities (i.e., disparities within the Region). In 1969, the last year for which income on a county basis is available, 13 per cent of the provincial income originates in Eastern Ontario, out of which 50 per cent is contributed by the Ottawa-Carleton area. Per capita income in Ottawa-Carleton is considerably and consistently above the provincial average; while in the more rural counties, particularly in the East, such as Glengarry, Grenville, Prescott, and Russell, it is considerably below the provincial average. The per capita income of the Region as a whole (\$2,724 in 1969) is also below that of all Ontario (\$2,954 in 1969).

Urban System

The urban system is not a "self-contained" feature of the Region. Ottawa is the largest city of the Region and a major source of employment and service facilities in the Ottawa Valley. However, the eastern counties tend to look to Montreal for their sophisticated shopping such as furniture, appliances, automobiles, and other facilities, because of their bicultural character; the western communities surrounding Kingston, Belleville/Trenton, and Picton, go to Toronto for higher order services such as management, consulting, legal services, financing, etc. All major urban centres except Ottawa have a population below 80,000. Thus, the urban hierarchy of the Region loosely resembles a "primate" city distribution, where one city dominates the whole region in population though not in the provision of services.

Transportation Corridors

The Region possesses two natural water corridors provided by the Ottawa River and the St. Lawrence River. The Rideau Canal system - an artificial system - is the third waterway that connects the two natural waterways with links at Ottawa and Kingston. There are port facilities at centres along the St. Lawrence. Two major highways follow the major water routes, 401 along the St. Lawrence and highway 17 along the Ottawa River. Recently, a second four-lane highway 417 has been built to connect Ottawa with Montreal. There are several other highways and roads that connect with the major highways and serve the smaller urban centres. The major airport of the Region is in Ottawa. The Region also has more than 30 small airfields; those at Kingston, Pembroke, and Brockville have some commercial passenger services. Bridges over the St. Lawrence at Ivy Lea, Johnstown and Cornwall link the Region with the United States. Several bridges across the Ottawa River link the Region with Quebec.

Economic Structure

The Public Sector

The public sector that has always been of importance in the past, now dominates all other economic activities in the Region, especially in the Ottawa area. Table 1.1 indicates that about 121,000 public servants (i.e., those in federal, provincial, and local governments and their agencies) were working in the Region. In 1978, the figure rose to 137,000, representing 29 per cent of the total labour force (and 31 percent of total employment). The corresponding percentage

¹If one includes employees of the post-secondary institutions, the percentage climbs to 33 per cent. This figure relates to the year 1978.

for the province as a whole was 11.3 per cent (10.5 per cent)¹. In the Ottawa area alone, about 91,000 federal civil servants were employed out of a total of 590,000 for the country as a whole.

Besides the federal government in Ottawa, there are Canadian forces bases at Petawawa, Barrifield, and Trenton, and a penitentiary and Royal Military College at Kingston. The recent decision of the Ontario government to move the office of the Ontario Health Insurance Plan to Kingston will further increase the role of the public sector.

The services sector, including finance, banking, retail and wholesale trade, education, public health, public administration and defence, employs more than half of the working force of the Region.

Farming

Farming is still important to the Region, especially to the eastern counties. It employs about 5 per cent of the Region's experienced labour force² and produces 11 per cent of the value added production in the Region. According to the 1971 Census, there were 18,327 farms with an average size of 214 acres. Although the size of farms in the Region was considerably larger than those in the rest of the province, they were not profitable. Only 15 per cent of them sold more than \$15,000 worth of agricultural products in 1971, as compared with 27 per cent in the province as a whole. Similarly, 64 per cent sold less than \$5,000 in that year compared with 44 per cent in Ontario. The Region includes 7.3 million acres of land, of which 53.4 per cent are used for farming. Dairy farming is by far the most important farm activity; two-thirds of the Region's farmers are dairy farmers.

Forest Resources

Forest resources are substantial in the Shield area and in some parts

¹ These percentages do not tally with those given in Table 1.1 because of differences in definition of public service adopted by the table.

² See notes on page 14 for the definition of experienced labour force.

of the Ottawa Valley. Forests cover about 40 per cent of the total land area. This proportion is somewhat higher in the Ottawa Valley and lower in the upper St. Lawrence. In the Renfrew area, forests cover about two-thirds of the total land area.

Tourism and Recreation

Tourism is one of the major attractions of Eastern Ontario and is vital to its economy. About 17 per cent of the Region's estimated gross product is derived from tourism and recreation, compared with the provincial figure of 11 per cent. According to the Census of 1971, tourism in the Region employs directly about 15,000 people or 3.6 per cent of the total employment (Table 1.1). This figure rose to 37,000 in 1976, constituting 8 per cent of the total employment in the Region.¹

The major tourist attractions of the Region are: the Parliament Buildings, National Museum of Science and Technology, National Museum of Man and Natural Sciences, National Gallery, and National Arts Centre, all at Ottawa; the Thousand Islands, the Rideau Waterways, the lakes of the Shield, Fort Henry and Fort Frederick at Kingston, Upper Canada Village, and Fort Wellington at Prescott. A proposed timber town near Arnprior on the Ottawa River will be a new attraction. While tourist attractions in the Region are scenic, political, historical and cultural, there are also ideal facilities for boating, hunting, fishing, skating (the Rideau Canal) and cottaging. There are important tourist attractions across the Ottawa River, e.g. skiing.

¹This figure relates to the economic region of Eastern Ontario as defined by Camu, *et al.*, and not to the planning region. It is estimated that perhaps the figure would be as high as 39,000 if an allowance is made for an additional area in the planning region of Eastern Ontario which was not included in the economic region. Also, there may be undercounting of tourist employees as some of the federal and provincial government employees may have tourism-related duties.

Scale 1:100,000
0 5 10 20 Kilometers

ONTARIO MINISTRY OF TREASURY, ECONOMICS AND DEVELOPMENTAL AFFAIRS
REGIONAL PLANNING BRANCH

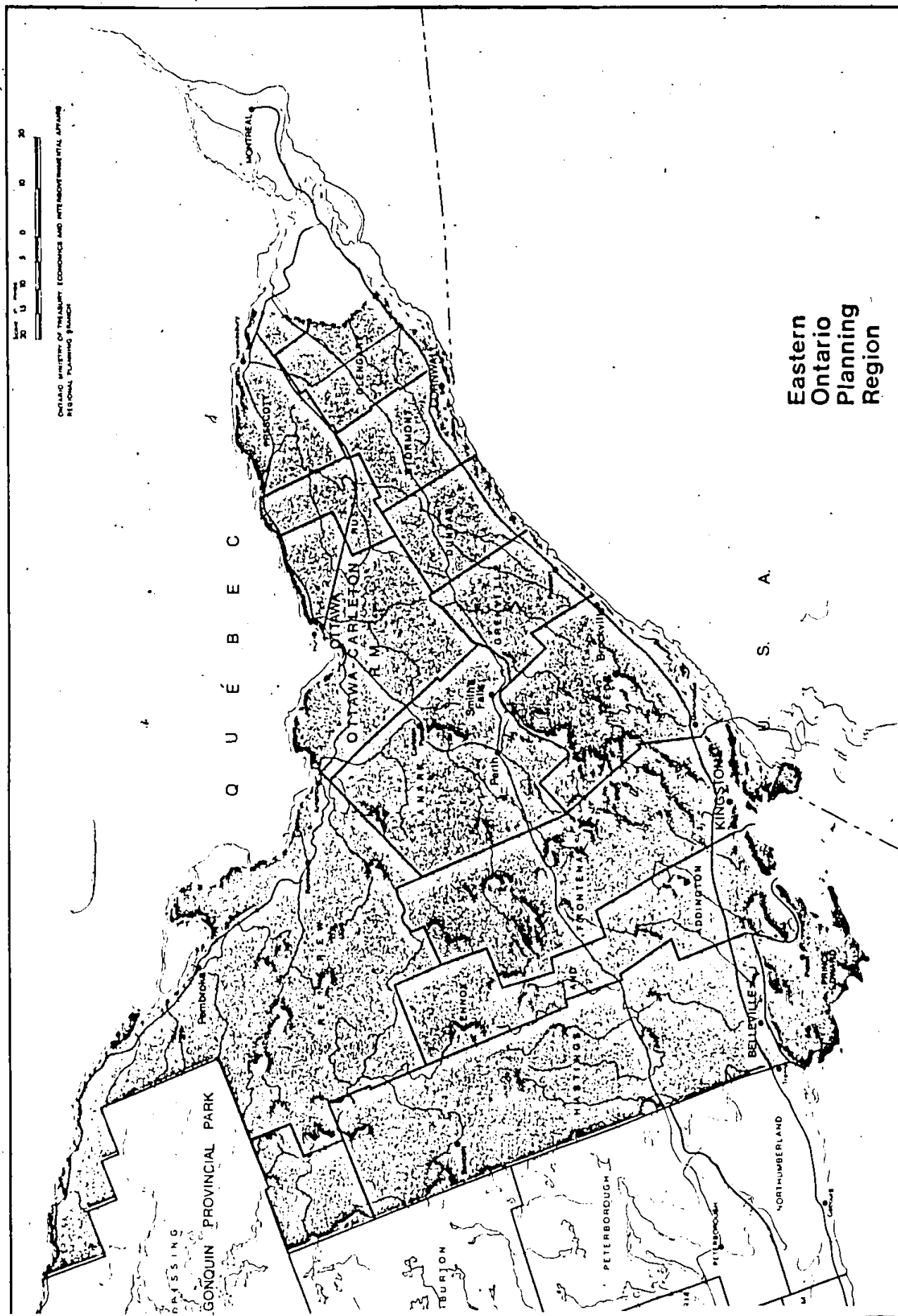


Table 1.1

Experienced Labour Force by Industry Division, Eastern Ontario Planning Region and Province of Ontario, 1971

	EASTERN ONTARIO PLANNING REGION			PROVINCE OF ONTARIO			EASTERN ONTARIO AS % OF ONTARIO	
	NO.	1971	% OF TOTAL	NO.	1971	% OF TOTAL		
<u>ALL SECTORS</u>	<u>450,250</u>		<u>100.0</u>	<u>3,354,360</u>		<u>100.0</u>	<u>13.4</u>	
<u>PRIMARY SECTOR</u>	<u>23,995</u>		<u>5.3</u>	<u>180,350</u>		<u>5.4</u>	<u>13.3</u>	
Agriculture	21,575		4.8	129,905		3.9	16.6	
Forestry, Fishing & Trapping	1,195		0.3	9,900		0.3	12.0	
Mining, Quarries, Oil	1,225		0.3	40,545		1.2	3.0	
<u>SECONDARY SECTOR</u>	<u>86,575</u>		<u>19.2</u>	<u>1,025,120</u>		<u>30.6</u>	<u>8.4</u>	
Food & Beverage Industry	7,755		1.7	86,755		2.6	8.9	
Textile & Clothing Industry	8,865		2.0	56,225		1.7	15.8	
Wood, Furniture, Paper & Allied	8,150		1.8	82,870		2.5	9.8	
Primary Metal, Metal Fabricating								
& Machinery Industries	8,830		2.0	202,195		6.0	4.4	
All Other Manufacturing	27,425		6.0	391,290		11.7	7.0	
Construction	25,495		5.7	205,785		6.1	12.4	
<u>TERTIARY SECTOR</u>	<u>304,640</u>		<u>67.7</u>	<u>1,909,790</u>		<u>56.9</u>	<u>15.9</u>	
Tourism Related	15,115		3.4	120,785		3.6	12.5	
Trade	56,340		12.5	497,560		14.8	11.3	
Public Service	121,475		27.0	469,465		14.0	25.9	
Social Services	63,000		14.0	412,545		12.3	15.3	
Personal Services	48,735		10.8	409,435		12.2	11.9	
<u>INDUSTRY UNSPECIFIED OR UNDEFINED</u>	<u>35,040</u>		<u>7.8</u>	<u>239,095</u>		<u>7.1</u>	<u>14.6</u>	
<u>POPULATION</u>	<u>1,071,100</u>			<u>7,703,100</u>			<u>13.9</u>	

Notes: Due to random rounding, figures may not add to totals. Experienced labour force include those workers who had work experience during the reference period of the 1971 Census, January 1, 1971 to June 1, 1971.

Source: Canada, Statistics Canada, Census of Labour Force, Industries by Sex, 1971, Vol. III, Part 4, Cat. No. 94-741. This Table was obtained from Ontario Ministry of Economics and Intergovernmental Affairs.

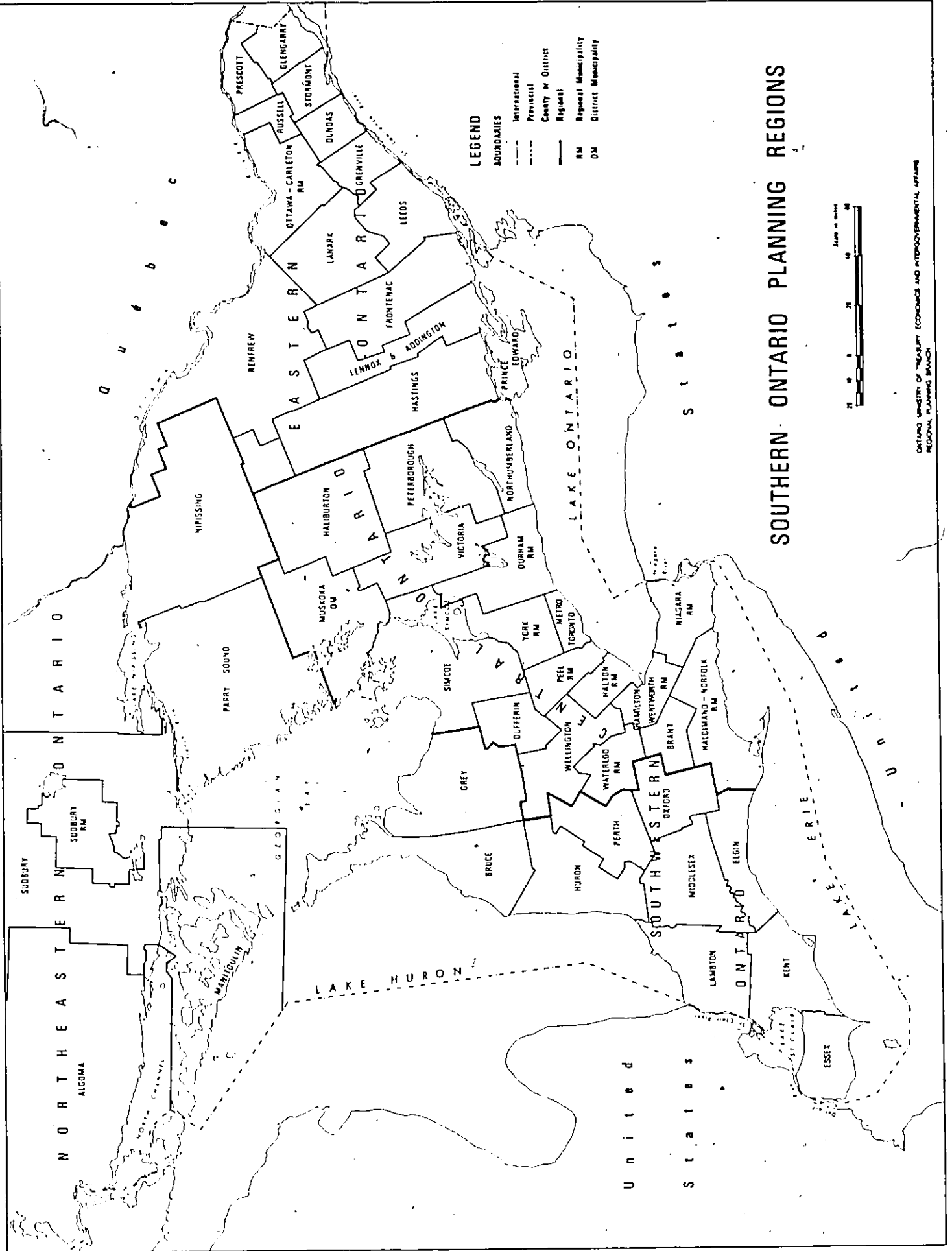
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	NO.	% OF TOTAL		NO.	% OF TOTAL				
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PERIOD I

CHAPTER II

Transportation Prior to 1851

II.1 Introduction

To some extent, the process of early settlement and development in Eastern Ontario is simply the story of two waterways - the Ottawa River in the North and the St. Lawrence River in the South. The fur trade, the timber and lumber trades, the pattern of agricultural settlement, the location of manufacturing establishments, notably sawmills and flour and gristmills, in the early part of the nineteenth century were all dependent on one of the two major waterways and their tributaries.

II.2 Water Transportation

a. The Ottawa Route

The Ottawa route starts from Montreal where the Ottawa River empties into the St. Lawrence and finishes at Georgian Bay on Lake Huron, with further connections to Lakes Michigan and Superior. Convenient portages to Lake Nipissing give a through waterway via the French River all the way from Montreal to Lake Huron and other upper lakes.

The Ottawa route was first used in 1615 by Samuel de Champlain and later by French fur traders and other explorers who followed him, and their successors of the Northwest Company. The route was also used by timber traders of the Ottawa Valley to float timber rafts down to Quebec.

This route had an obvious advantage over the St. Lawrence-Great Lakes route. It was shorter by about 300 miles. It also provided a waterway to the Great Lakes that was entirely in Canadian territory, and that would have provided safe shipments in the event of hostilities with the U.S., but the route was not without its problems, notably a series of falls and rapids (e.g., the Chaudière Falls, the Chats Rapids, the Carillon Rapids). Consequently, only canoes could be used for transportation purposes. Heavy goods could not be transported on this route in its natural state.

b. The St. Lawrence-Great Lakes Route

The other route to Lake Superior and to the West was the St. Lawrence-Great Lakes route. Like the Ottawa, the St. Lawrence route¹ was obstructed by a number of rapids and falls (e.g., the Lachine Rapids and the Niagara Falls) that entailed a number of portages and transshipments. It is one of the major river systems of the world, with a total drainage area of about 618,000 square miles, almost 12 times the size of England, Wales and Scotland combined.²

The merchants of New France used it for the fur trade, as did the North West Company and later for the timber and lumber trades. This study will be

¹The terms "St. Lawrence route" and "St. Lawrence-Great Lakes route" are used interchangeably unless otherwise mentioned.

²R.F. Legget, Canals in Canada (Vancouver: Douglas, David & Charles, and Newton Abbot: David and Charles, 1976), p. 123.

concerned with that part of the route that lies within Eastern Ontario. More than 100 miles of the St. Lawrence-Great Lakes route fall in Eastern Ontario. With the exception of Ottawa, all the major urban centres of the Region (i.e., Cornwall, Prescott, Brockville, Kingston, Belleville, Trenton) are located on this route.

The main advantage of this route over the Ottawa was that bateaux, Durham boats, and sailing vessels could be used. The St. Lawrence-Great Lakes route was, thus, complementary to the Ottawa route, in the sense that light items such as fur were carried by the latter and heavy items such as lumber and wheat were carried by the former. However, this route required transshipment of goods to or from the Great Lakes because the Great Lakes vessels could not pass through the St. Lawrence owing to the depth of the channel and the numerous rapids between Lake Ontario and Montreal, and each rapid meant overland transport.

There was another route outside Eastern Ontario that was a competitor to the St. Lawrence-Great Lakes route. This route to the Great Lakes (known as "the Hudson-Mohawk" route) was by way of New York, up the Hudson River to Albany, up the Mohawk River Valley, then to the West through an unusual geological gap in the mountains over a portage to Wood Creek, the Oneida River, down to the level plain to the South of Lake Ontario, and so down the old Mohawk Trail.¹ From Lake Ontario, it followed the St. Lawrence-Great Lakes route. The Hudson-Mohawk route was used for the construction of the Erie Barge Canal, a great improvement.

II.3 History of Water Transportation

The history of water transportation in Eastern Ontario before the middle of the nineteenth century had three phases: (1) Transportation and

¹R.F. Legget, op. cit., p. 185.

the fur trade, (2) Transportation and the square timber trade; and (3) Transportation and the trade in wheat, consumer and capital goods or the settlement period. This classification, though it suffers from overlapping in time periods, helps bring out the problems posed by the transportation of different types of materials and the solutions worked out to overcome them.

II.3.1 Water Transportation and the Fur Trade

During the French period, overland transportation was used mostly to portage the cargo past obstructions in waterways, rapids or falls or heights of land. Waterways were the main means of transportation and the fur trade was the main stimulus for the development of long distance transportation. The Ottawa, the main highway to the West, was used extensively for the fur trade. The merchandise on the Ottawa was carried in canoes, which were best suited to the character of the Ottawa route that entailed 36 portages between Lachine and Georgian Bay. Because the canoes were made of birch bark, they were light and, unlike boats, could be carried over portages.

The St. Lawrence route, on the other hand, was used locally and experiments were made with bateaux to replace canoes.¹ Later, however, when New France was transferred from the French to the British in 1763, the St. Lawrence route was developed as an alternative to the Ottawa. A group of British American traders from Albany moved up to Montreal from whence they used the old French trade route to the West on the St. Lawrence and Great Lakes. Nonetheless, the Ottawa retained its importance even after 1763, as it was the fastest route for the eastbound cargoes of furs.

¹The French tried to use sailing vessels on the Great Lakes but with limited success.

The fur trade on the St. Lawrence-Great Lakes and Ottawa routes did not significantly affect the economy of Eastern Ontario as both of these routes involved through traffic. However, where there were major portage and camping places, as at Quyon, P.Q., private traders set up businesses - like taverns. Further, as the fur trade moved to the West, and the lines of communication lengthened, the problem of supplying food to the employees of fur trade companies became acute. To overcome this problem, trading posts were established to obtain a food supply from local sources, thus opening local markets for commercial purposes and providing employment in the administration of these trading posts. However, most of the fur trading posts on the Ottawa were located on the Quebec side of the river, e.g., Fort Coulonge, Davidson, and Lac des Allumettes. The flour and material supplies for Fort Coulonge and Lac des Allumettes came from Alexander. Therefore, the fur trade had a limited impact on the development of Eastern Ontario.

II.3.2 Water Transportation and the Timber Trade

The absorption of the North West Company in 1821¹ by the Hudson's Bay Company and the consequent disappearance of the fur trade on the St. Lawrence and the Ottawa, however, did not mean the end of traffic on these routes. In the early part of the nineteenth century, the Region witnessed the rise of another staple, "square timber". Rafts of white pine from the Ottawa Valley floated down the Ottawa River. The first raft of square timber (called "Colombo") came floating down the Ottawa and the St. Lawrence to the harbour of Quebec in 1806. Timber rafts also came down the St. Lawrence. By 1820, they were coming down the St. Lawrence from the eastern end of Lake Ontario,

¹Thenceforth, the fur trade was carried on through Hudson Bay on the Pacific coast, and later, through St. Paul, Minnesota.

i.e., from Kingston and the surrounding areas.¹

II.3.3 Impact of the Ottawa and the St. Lawrence Rivers During the Timber Trade

The Ottawa and St. Lawrence Rivers provided an effective means of transport for timber exports from Eastern Ontario. The Region, especially the Ottawa Valley, would not have witnessed such a rapid growth in the first half of the nineteenth century (see below later sections "Population Growth", and the "Square-Timber Trade") without these great rivers which gave easy access to trans-Atlantic markets and made possible the rapid exploitation of the white pine forests of the Region. However, forest exploitation was limited to watershed as logs could be floated only downstream. The transit of timber through the timber slides (explained later) at the Chaudière Falls at Bytown (now Ottawa) occasioned stop-overs for thousands of timbermen and, thus, created an increased demand there for the necessities of life. Later, especially with the opening of the Rideau Canal in 1832, Bytown developed into a provision depot for the lumber camps operating along the Ottawa and its tributaries. As a depot for forest products to be transhipped to Montreal or Kingston, and for provisions, equipment and manufactured goods, Bytown afforded several advantages to the neighbouring countryside (e.g., a market for farm produce, which induced many farmers in this part of the country to direct their attention to rearing and feeding stock to supply the demand.)²

The timber trade on the St. Lawrence route also greatly affected the economy of Eastern Ontario. Several major urban centres, Cornwall, Prescott,

¹W.T. Easterbrook, and H.G.T. Aitken, Canadian Economic History (Toronto : The Macmillan Company of Canada Limited, 1965), p.196.

²Lucien Brault, Ottawa, Old & New (Ottawa : Ottawa Historical Information Institute, 1942), pp. 175-176.

Brockville, Kingston, Belleville, and Trenton developed as points of transshipment and as ports. Kingston was the main beneficiary of transshipment operations. Goods were shipped upstream from Lachine just east of Montreal and at Kingston they were transferred to lake vessels. Kingston was also used as a convenient place for storing timber and constructing rafts before floating them down the St. Lawrence. Prescott was another transshipment point. Other ports did not play a significant role in the economic growth of the Region until the canalization of the St. Lawrence route. Several rapids on these two rivers and many portages gave rise to the development of small communities and economic activities.

III.3.4 Water Transportation and Trade in Wheat, and Consumer and Capital Goods - (Era of Canal Construction)

The beginning of the second quarter of the nineteenth century was characterized, apart from the rapid growth of the timber trade, by the rise of wheat as a staple product (in the area presently known as Ontario), and the progress of settlement. These developments imposed a heavy burden on the St. Lawrence-Great Lakes route. The route proved to be inadequate in relation to the new requirements.

The exports of forest and agricultural products, which were low in value in relation to their bulk and weight, could not be transported in canoes. Thus, a need was felt for an improvement in the existing means of transportation.

The completion of the Erie Barge Canal in 1825 also brought to the surface the limitations of the St. Lawrence-Great Lakes route. The Erie Canal connected the Great Lakes with New York, a port that was open all year, in contrast to Montreal and Quebec which were closed by ice in the winter. Trade from the mid-west was, thus, diverted from Montreal. The competitive and relatively short Erie Canal route to New York destroyed the previously

advantageous position of Montreal. The need to improve the St. Lawrence was also felt with the construction of the Welland Canal in 1829, which increased the flow of traffic from the Great Lakes to the St. Lawrence.

Another reason for constructing canals in Eastern Ontario was the military need to develop an alternative route to the St. Lawrence from Montreal to Kingston. The War of 1812 had made the British government painfully aware of the potential dangers of the vulnerable St. Lawrence route between these cities. It was feared that Americans might cut off supplies in the event of another war. The construction of the Rideau Canal and the Ottawa Canals provided that alternative route. 7

Finally, with the progress of settlement in the Region, a need was felt for better transport to carry settlers and the consumer and capital goods then required to the interior. The canals provided through navigation to the interior and made upstream traffic possible. Steamboats eventually replaced canoes, bateaux, Durham boats, and sailing ships.

a. The Ottawa River Canals

Travellers up the Ottawa River were faced with three sets of rapids at Carillon, Chute à Blondeau, and the Long Sault. These rapids had to be passed if an alternative route to Kingston was to be developed. To overcome the difficulties presented by these rapids, the Ottawa River was improved in 1819-1834 by the construction of a lock at its junction with the St. Lawrence at Ste. Anne de Bellevue, and a series of small canals to bypass Carillon, Chute à Blondeau, and Grenville rapids. These canals located about 60 miles east of Ottawa and west of Montreal, were built by the Royal Staff Corps at an approximate cost of £8000 per year for 10 years.¹

¹R.F. Legget, Canals of Canada, op. cit., p. 66.

Though initially constructed and used primarily for defence purposes, these canals were quickly put to use for commercial purposes, especially after the completion of the Rideau Canal. That they were badly needed is evident from the petition signed by merchants in Kingston on May 7, 1832, addressed to the Governor (then Lord Aylmer), protesting the delays in the completion of the Ottawa River canals and pointing out their value for the development of trade to the west.¹ They were also used for sawn lumber, which passed on specially designed barges from the sawmills in Ottawa on their way to Montreal and the U.S.A. With the opening of these canals, passenger traffic by steamboat on the Ottawa River between Ottawa and Montreal increased.

b. The Rideau Canal

The southwest portion of the Ottawa-Rideau route to Ottawa from Kingston was provided by the Rideau Canal. Like the Ottawa Canals, the Rideau Canal was initially built for the purpose of defence. However, in the case of the Rideau Canal, the project was also designed to expedite settlement of the strategic areas of the Province. It was believed that the Rideau Canal would provide settlers with an outlet for their produce and increase their prosperity. On the other hand, it was also hoped that the settlement of the area by surplus veteran soldiers would strengthen the militia forces in emergencies. Thus, military settlements and the canals were complementary, each facilitating the other.²

The Rideau Canal route was formed by linking together a chain of rivers (the Cataraqui, the Styx, and the Rideau) and Lakes (Dog Lake, Cranberry

¹R.F. Legget, Ottawa Waterway (Toronto and Buffalo: University of Toronto Press, 1975), p. 144.

²George Raudzens, The British Ordnance Department and Canada's Canals 1815-1855 (Waterloo, Ontario: Wilfrid Laurier University Press, 1979), p. 43.

Lake, Whitefish Lake, Opinon Lake, the Upper Rideau Lake, Big Rideau Lake, and Lower Rideau Lake) by canals and locks. It traverses two major physiographic regions of Eastern Ontario: the St. Lawrence Lowlands and the Pre-Cambrian Shield. The difference in land height of these two sub-regions was one of the factors making the construction of the Rideau Canal necessary to link Ottawa with Kingston.

The Canal was built in 1826-1832 under the supervision of Colonel John By of the Corps of Royal Engineers. It was completed at a final cost of about £800,000, twice that initially anticipated.¹

The opening of the Rideau system shortened the time for upstream traffic to Kingston from 12 days by the St. Lawrence to 5 days by the Ottawa-Rideau system.² The traffic on the Rideau waterway increased speedily. It was estimated (by the superintending officer of the Rideau Canal) that in 1835 more than three-quarters of all imports into Upper Canada - over 8000 tons a year - passed through the military waterway.³ In the peak year of 1844, the military waterway was meeting all the needs of Canadian commerce, 35000 tons of imports passed through the canals, 609,000 bushels of flour, 360,000 bushels of wheat and 21,000 barrels of pork arrived by it at Montreal.⁴

The opening of the Canal affected the economy of Eastern Ontario a great deal. It expanded Kingston's hinterland. Agricultural products could

¹Ontario, Department of Energy and Resource Management, The History of the Rideau Waterway (Toronto: Conservation Authorities Branch, 1970), p. 26.

²R.B. Sneyd, "The Role of the Rideau Waterway, 1826-1856," unpublished M.A. Thesis, University of Toronto, 1965, pp. 61-63.

³Cited in George Raudzens, op. cit., p. 141.

⁴R.B. Sneyd, op. cit., p. 121.

now be moved freely along the Canal to markets in Kingston and Ottawa. Steamboats on the Canal in the 1840's provided an economical means of transportation of goods to market.

Construction of the Canal increased immigrant travel via the Ottawa-Rideau system and stimulated settlement in the Ottawa area and the Rideau country. By 1840, 12,000 people had passed through the locks at Bytown, 1400 of them settled in the Ottawa area.¹ In the Rideau country for example, 40 years prior to the construction of the Rideau Canal, the settlement of Merrickville had grown slowly to a community of 300 people; 30 years after the opening of the Canal, the village had a population of 1200.² In 1835 the settlement of Perth, which was founded in 1816 by discharged soldiers after the War of 1812, constructed the Tay Canal - a link with the Rideau Canal - to ship square timber and a variety of other products down the Tay and thence to the Rideau Canal.³

Besides promoting the settlement, the Canal stimulated the economic growth of the Region. Several flour and grist mills, saw works, and oatmeal mills sprang up along the Canal. Local enterprises to organize shipping on the Canal also came into being.⁴

The construction of the Rideau Canal itself also generated employment and income effects in the Region. During the course of its construction, it provided employment to 2000 workers,⁵ most of whom were either French Canadians

¹ R.B. Sneyd, op. cit., pp. 56-58, 59.

² Canada, Environment Canada, Ecotour of the Rideau Canal (Ottawa: 1978), para. 33 (no pagination).

³ G. Raudzens, op. cit., p. 142.

⁴ Canada, Environment Canada, Ecotour of the Rideau Canal, op. cit., para. 25.

⁵ J.E. Alexander, "Bytown and the Rideau Canal in the 1830's," in Gerald Craig (editor), Early Travellers in the Canadas (Toronto: The Macmillan Company of Canada Ltd., 1955), p. 86.

or Irish immigrants. Clearly, they required provisions and spent their wages on the purchase of goods some of which were locally or regionally produced (e.g. wheat); while others, like pork and peas, were mostly imported from the U.S.A. The expenditure of the workers, even taking into account import leakages, thus, seems to have had some multiplier effects on the economy of Eastern Ontario. Some of these multiplier effects seem to have been temporary, as the Canal was completed in 1832, while others were permanent, as some of the workers continued to be employed for the operation and maintenance of the Canal. Finally, according to Raudzens, the construction of the Rideau and Ottawa Canals was one of the factors that influenced the choice of Ottawa for the capital city.¹

c. The St. Lawrence Canals

The limitations of the St. Lawrence-Great Lakes route were severely felt on the completion of the Erie Canal in 1825. Canadians thought that much of the loss of trade from the West that had been diverted to the Erie route could have been avoided had the St. Lawrence-Great Lakes route been canalized. Lord Durham on July 10, 1838, while sailing westward up Lake Ontario, noted with great admiration the thriving town of Buffalo and said, "This prosperity is owing to the Erie Canal.... All these advantages might be ours by the judicious application of not a large expenditure."² Lord Durham, therefore, lost no time in recommending the construction of canals on the St. Lawrence.

Six canals were built along the St. Lawrence between Lake Ontario and Lachine between 1834 and 1848. The Cornwall Canal, completed in 1843, was built

¹G. Raudzens, op. cit., p. 143.

²Durham to Glenelg. No. 24 of July 12, 1938, cited in G.N. Tucker, The Canadian Commercial Revolution 1845-1851, Carleton Library No. 19, (Toronto: McClelland and Stewart Limited, 1964), p. 18.

to enable ships to pass the Long Sault rapids. The Beauharnois Canal, completed in 1845, connected Lake Francis to Lake Louis. The four Williamsburg canals between Prescott and Dickenson's Landing were completed in 1848.

As a result of the opening of these canals and the Welland and Lachine¹ Canals, the St. Lawrence route recaptured a part of its lost traffic. Now the freight carriers could pass up and down the St. Lawrence without any transshipment. The completion of these canals, therefore, reduced transport costs, and consequently the St. Lawrence route became cheaper than the Erie route. The cost of transporting downward a barrel of flour on the St. Lawrence route between Port Maitland and Montreal was 35 cents, compared with 77 cents for the same distance on the Erie route between Buffalo and Albany. There were similar differences in transportation costs for the upbound traffic.² The advantages of lower rates on the St. Lawrence, however, were partly cancelled by the fact that Montreal was not a winter port and that New York could provide more opportunities in terms of 'in' and 'out' facilities. "The glorious future predicted for the Canals", remarks Glazebrook, "never materialized, and perhaps never could have been expected to materialize."³ The canals came too late. By the time the St. Lawrence canals were put into operation, the St. Lawrence route was facing a new type of competition - competition from American railroads.

¹Sessional Papers, 1848, App. BB, cited in G.N. Tucker, op. cit., p. 40.

²The Lachine Canal by-passing the last of the St. Lawrence rapids, near Montreal was built in 1824. It has not been discussed here as it was outside our area of study.

³G.P. deT. Glazebrook, A History of Transportation in Canada, Vol. I (Toronto: McClelland and Stewart Limited, 1964), pp. 93-94.

Also these canals were underutilized in relation to their freight capacity. A recent study by McIlwraith reported that the actual downward tonnage on the St. Lawrence-Rideau system varied from 34 per cent of estimated minimum lock capacity to 6 per cent of estimated maximum capacity in 1832. The corresponding percentages in 1848 were 34 and 16. These percentages were much lower than those of the Erie, especially at the western end of the Erie, i.e., 136 and 39 for Utica in 1832, and 159 and 43 for Buffalo in 1848.¹ This means that the Erie Canal was utilized above its minimum capacity.

II.4 Road Transportation

In the early French regime, no pressing need was felt to construct roads because the waterways of the Ottawa and the St. Lawrence and their tributaries provided excellent highways for the fur trade, which was the main occupation of that time, and were sufficient for local needs. These routes were supplemented by portages, trails, and frozen rivers and lakes in the winter.

Later on, with the expansion of settlement into the interior, there arose a great need for roads, especially for portage roads and through roads which ran parallel to the waterways.² In the early 1790's, a road had been opened between Montreal and Kingston to overcome the difficulties posed by the rapids of the St. Lawrence. At the turn of the century, a road was built between Kingston and York (now Toronto) which ran parallel to the waterway. At some points, for example, between Kingston and Trenton, it followed an ancient Indian trail.³ Besides these roads, there were some other types of

¹T.F. McIlwraith, "Freight Capacity and Utilization of the Erie and Great Lakes Canals before 1850," Journal of Economic History, Vol. XXXVI, No. 4 (December 1976), p. 860.

²According to another view by McIlwraith, improved roads in Upper Canada before railroads were not necessary for settlement. Whatever rudimentary roads existed, they were adequate to meet the needs of farmers and settlers. See T.F. McIlwraith, "The Adequacy of Rural Roads in the Era Before Railways: An Illustration from Upper Canada", Canadian Geographer, Vol. XIV, No. 4 (1970), pp. 344-360.

³Jacob Spelt, Urban Growth in South-Central Ontario, The Carleton Library No. 51 (Toronto: McClelland and Stewart Ltd., 1972), p. 26.

roads, viz., colonization roads, port roads, and military roads. Colonization roads were built to promote settlement. Port roads linked inland settlements with ports and rivers and served as feeders for shipping on Lake Ontario and the St. Lawrence. Kingston was a focal point for feeder roads. However, its infertile Shield hinterland prevented the extension of roads to the North. Farther to the West, in Hastings County, a road was built to the iron deposits in Madoc and Marmora during the 1830's.

Most of the roads built in the Region before 1839 were dirty, corduroy, plank and unmacadamized roads, in wretched condition. Some of them were impassable for several months each year. The condition of military roads was not any better. The first macadamized road in the Region was built in 1839, linking Kingston with Napanee.¹ Road conditions improved during the 1840's when responsibility for the roads was transferred from local inhabitants to road companies which built roads and charged tolls. In spite of such improvements, waterways in Eastern Ontario remained the chief means of communication before 1850. There were few places in the interior of the Region which were connected with roads. Even the limited number of port-feeder roads were subordinate to the water routes, and their growth was checked with the opening of the railways in the 1850's. Another factor responsible for their slow growth in Eastern Ontario was the rise of Toronto and the consequent shift of road construction to that area.

II.5 Summary

In the first half of the nineteenth century, water transport was practically the only means of transportation and it served the needs of economic activities in Eastern Ontario very well. Rapids and falls on the °

¹ Jacob Spelt, op. cit., p. 64.

two major natural waterways before the introduction of steamboats, made upstream traffic difficult. The transshipment of freight made necessary by rapids and falls, stimulated the growth of port cities, such as Kingston and Prescott.¹

The construction of canals in the second quarter of the nineteenth century was an attempt, among other things, to overcome the problems associated with rapids and falls, and to make the St. Lawrence route to Montreal competitive with the Erie Canal route to New York. Canals also opened the hinterland around Bytown and Kingston, and thereby quickened the process of settlement of the Region. Canals, however, could not make the St. Lawrence route competitive, as at the time of their opening they faced new competition from the American railroads. The St. Lawrence Canals, by rendering the transshipment activities unnecessary, damaged transshipment towns on the River. (For more on this, see "Transportation" in the next period). Also, the canals could not provide access to the interior of the Region. Thus, a need was felt for a means of overland transportation. Small numbers of roads had been built, but they remained subordinate to the water routes which dominated the transportation system of the Region throughout the first half of the nineteenth century.

¹ H.A. Innis, Problems of Staple Production in Canada (Toronto: The Ryerson Press, 1933), p. 5.

CHAPTER III

Forestry Resources Prior to 1851III.1 Introduction

The development of forestry industries in the Region was closely related to the existence of waterways. Timber operations were dependent on waterways as a means of getting timber to market. The pattern of the timber trade, apart from demand considerations, was dependent on the existence of water transport facilities. The Ottawa and the St. Lawrence Rivers provided natural highways for the timber exports from the Region.

During the first half of the last century, the Ottawa Valley¹ was one of the regions that had vast forest resources. Table 3.1 illustrates the relative positions of the various timber-producing sub-regions and indicates that in 1844 about 75 per cent of the white pine resources of the Province of Canada were located in the Ottawa Valley (This is calculated by adding figures in the last 4 entries in each column and dividing that sub-total by the total for the Province of Canada), and 20 per cent from the St. Lawrence to the head of Lake Ontario.²

III.2 Beginning of the Timber Trade in Eastern Ontario

The increasing demand for wood arising from the Industrial Revolution, the shipbuilding industry, and the Napoleonic Wars between France and England for about two decades (1793-1815) were the three factors that created the British demand for Canadian timber. Before the War, almost all British imports of timber came from the Baltic countries (and to a small extent from New England). The British government first realized the dangers of her dependence on foreign sources during the American Revolution, when the supply

¹This includes pine in the Province of Quebec. It thus becomes difficult to determine how much of the timber from the Ottawa Valley comes from areas that fall into Eastern Ontario. The problem is complicated by areas "above Bytown" that include parts of both Ontario and Quebec.

²It is difficult to know exactly how much of the timber rafted on the St. Lawrence came from Eastern Ontario, as part of the timber rafted might have originated from areas in Central Ontario, in the West, or from areas in Lower Canada in the East.

of prime masts from New England came to a sudden end. This realization was reinforced by Napoleon who in 1806 had managed to close the Baltic countries to British trade. As a result, British pine imports from the Baltic countries were drastically reduced, i.e., to 23,932 loads in 1812, compared to 257,211 loads in 1803 (Table 3.2). Greatly alarmed by this situation, the British authorities turned to Canada for a timber supply. To encourage imports from her colonies in North America, she provided preferential treatment for timber supplies, and imposed heavy duties on timber imports from other countries. Consequently, exports of square timber from Canada and other British North American colonies jumped from 15,000¹ loads in 1805 to 280,000 loads in 1820 and to 640,000 loads in 1840; and those of deals rose from 400 great hundreds in 1805 to 10,000 great hundreds in 1820, and to 33,000 great hundreds in 1840.²

Two major and distinct types of operation can be recognized in Eastern Ontario's exploitation of forest resources in the nineteenth century: the use of trees to make square timber, and the use of trees for sawn lumber or for planks and boards. Though these two operations were contemporary, square timber was more important than sawn lumber in the first half of the nineteenth century, whereas the latter dominated the former in the second half of the nineteenth century. In the case of square timber, pines were cut, squared, floated down tributaries of the Ottawa or the St. Lawrence, made into rafts and floated on to Quebec and then shipped to England. In sawn lumber operations, Canadian mills cut saw logs into deals, which were shipped to Britain for finishing. Later on, after 1830, sawn lumber (in

¹This figure differs from that in Table 3.2 because of two different sources.

²S.J. Gillis, Timber Trade in the Ottawa Valley, 1806-1854 (Ottawa: Parks Canada, Department of Indian and Northern Affairs, National Historic Parks and Sites Branch, manuscript No. 153, 1975), pp. 305-307.

Note: A great hundred of deals equalled 120 deals. Timber and deals are related through the equality of 1 cu. ft. of timber = 10 board feet planks of deals. One deal was a 4" thick soft wood plank. Also, one load of square timber equalled 50 cubic feet.

Table 3.1
Timber Production by Regions 1844-46
Number of Cubic Feet Measured

REGIONAL SOURCE	WHITE PINE			RED PINE		
	<u>1844</u>	<u>1845</u>	<u>1846</u>	<u>1844</u>	<u>1845</u>	<u>1846</u>
Quebec and Montreal	416,135	689,768	1,163,081	85	7,327	68,582
St. Lawrence, Montreal to head of L. Ontario	2,469,625	4,338,082	7,567,081	55,125	50,346	249,597
Lake Erie	60,204	196,136	279,763	-	28,001	178
Ottawa below Bytown	1,992,936	3,229,672	4,988,337	6,931	11,072	120,974
Gatineau River	658,907	1,201,028	1,477,357	110,819	48,403	133,155
Rideau River	515,188	1,167,823	1,653,851	1,106	40,183	67,460
Ottawa above Bytown	6,052,783	8,319,466	7,532,764	3,989,197	4,259,184	4,543,549
TOTAL	12,165,778	19,141,982	24,662,815	4,163,263	4,444,515	5,183,307

Source: Annual returns of the Supervisor of Cullers, Province of Canada, cited in
A.R.M. Lower, Great Britain's Woodyard: British America and the Timber Trade, 1763-1867, (Montreal: McGill-Queen's Press University Press, 1973), p. 208.

Table 3.2

Importation of Pine into Britain 1800-1815

(in loads)*

<u>Year</u>	<u>Europe</u>	<u>Canada</u>	<u>Maritimes</u>	<u>Total</u>
1799	140,043	29	885	140,957
1800	175,460	323	1,348	177,131
1803	257,211	1,350	8,436	266,997
1805	227,243	1,263	8,154	236,660
1807	197,147	2,700	24,602	225,049
1810	130,388	38,869	97,782	267,039
1812	23,932	32,716	57,248	113,896
1814	110,943	8,349	85,444	204,736
1815	167,886	11,676	117,062	296,624

* A load of square timber equalled 50 cubic feet.

SOURCE: Adapted from S.J. Gillis, op. cit., p. 304.

the form of boards and planks) began to be exported to the U.S.A. (See subsection III.3.1 for more on this point).

The square timber trade in Eastern Ontario began in 1806,¹ when Philemon Wright from the North side of the Ottawa River² (i.e., a place now called Hull) built a raft of timber and set out for Quebec City. Wright's pioneering raft of pine timber was soon followed by others, and within a few years pine timber was cut far above the Chaudière Falls at the site of modern Ottawa. The sudden surge in British demand for square timber attracted many residents of the Canadas and the U.S.A. to the Ottawa Valley for timber operations. Two important men among them were Mears and Hamilton of Hawkesbury.

III.2.1 Organization of the Timber Trade and Industry

The square-timber trade was a joint venture of timber producers, shantymen, raftsmen, and timber merchants. The first step on the part of timber producers was to secure a supply of timber; this was initially provided by settlers but later, as the relationship of employee-employer developed, the producers obtained a license from the Crown to cut timber in a given area and hired shantymen to fell the trees during the winter.

¹A.R.M. Lower, "The Trade in Square Timber", in W.T. Easterbrook and M.H. Watkins (eds.), Approaches to Canadian Economic History (Toronto: McClelland and Stewart Limited, 1971), p.42.

²In discussing the timber trade, as mentioned earlier, it is impossible and incorrect to confine the account strictly to the Ontario side of the River, as the timber industry in the early days developed simultaneously on both sides. Some of the largest firms drawing their supplies from the Ontario side of the river were located on the Quebec side. It was also difficult to determine whether a stick of square timber that floated on the Ottawa River was harvested on the Ontario or Quebec side of the River.

Felling a tree required skill and tools such as axes and saws. After the trees were felled, they were squared, floated down the rivers in the river drive, made into rafts and taken down the Ottawa River and the St. Lawrence to Quebec where they were sold to British merchants for shipment to Great Britain.¹

On the St. Lawrence River, the cutting of timber was largely incidental to the clearing of land for settlement. The settler cleared away the forest before starting to raise a crop and sold the logs to local timber merchants. The Ottawa Valley, on the other hand, had relatively little land suitable for permanent agricultural use and, thus, the volume of timber cut did not depend on the clearing of land for agriculture. The agriculturist, rather, tended to follow the timber frontier. Another difference was that the timber trade on the St. Lawrence was more specialized than the trade on the Ottawa; timber-making and rafting were frequently combined on the latter, while they were separate specialties on the former.

The timber industry in Eastern Ontario, which started as a highly unorganized and unregulated industry at the beginning of the nineteenth century, had become quite a well-organized, consolidated and regulated (in terms of granting exclusive rights of timber cutting, issuing and renewing of licenses; requiring minimum cuts. etc.) industry by the middle of the nineteenth century. In the early days, a farmer could take flour and a barrel of pork into the woods in the fall, cut trees in the winter, deliver them to a timber operator on the river,

¹For a detailed discussion on methods of handling timber on the Ottawa and St. Lawrence Rivers and their relative advantages, see A.R.M. Lower, "The Trade in Square Timber", W.T. Easterbrook and M.H. Watkins (eds.), Approaches to Canadian Economic History (Toronto: McClelland Stewart Limited, 1971), p. 44.

and be back on his farm in time for spring planting. During the 1830's, as the frontier of timber operations moved upstream as far as Lake Temiscaming, the long time away from home, imposed by the distance, and the need for increased capital investment tended to eliminate the part-time lumberers. The process of elimination of small and part-time lumberers led to concentration of the timber trade in the hands of large-scale professional timbermen - "capitalists", as they liked to call themselves, "big bourgeois", as the shantymen called them.¹

In the absence of sufficient data on the production of square timber and deals in the Region in the first half of the nineteenth century, it is difficult to measure the process of consolidation, but there are indications that point to the growth of large firms and the decline of small firms. One indication is the grant of exclusive rights to a limited number of lumbermen to cut timber and saw logs on certain tributaries of the Ottawa. The holders of these privileges were people of substantial means, e.g., Philemon Wright and Sons, Hamilton and Low, Peter Aylen, Thomas McGoey, Christopher C. Wright, Alexander MacDonnel, Simon Hill, and David Moore. This system of granting privileges prevailed on the Lower Canada side of the Ottawa Valley and not on the Upper Canada side, where approximately two-thirds of the timber from the Ottawa Valley was cut.² Nonetheless, a statement in the Bytown Gazette in 1838 is an evidence of the process of consolidation on the Upper Canada side of the Ottawa Valley: "the quantity (of timber) made will be as large as heretofore - we find, however, that the trade is in fewer hands."³

III.2.2 Estimates of the Timber Trade

There are no statistics that record the amount of timber taken

¹ S.J. Gillis, op. cit., p. 96.

² S.J. Gillis, op. cit., p. 98.

³ Bytown Gazette (December 26, 1838), cited by S.G. Gillis, op. cit., p. 98.

to market from Eastern Ontario during the first quarter of the nineteenth century. One can rely only on estimates referring to particular areas or people. John Lebreton, who lived just above the Chaudière Falls on the Ottawa River, reported in the spring of 1824 to the authorities in Upper Canada that Philemon Wright and his sons had boasted that their firm would cut 800,000 cubic feet of timber from the King's forests.¹

Charles Shirreff estimated that about 1.2 million feet of timber had been cut above his place (Fitzroy Harbour) on Crown Lands in 1824.² Two years later, a government survey estimated that about 800,000 cubic feet had been taken from the Bonnechere River (near Pembroke) in the previous season. Another area in Eastern Ontario where the timber trade was thriving was Lanark County. It is estimated that in the middle of the nineteenth century in Lanark and Renfrew Counties, about 10,000 people were directly or indirectly involved in the timber trade.³

The timber trade in Eastern Ontario during the second quarter of the nineteenth century (1825-1850) was undergoing a process of expansion. Because the supply of white pine suitable for making square timber was receding in the areas near waterways, efforts were made by lumbermen to work farther upstream and on hitherto unused tributaries (e.g., the Gatineau and the Rideau). By 1832, according to Charles Shirreff, the Gatineau River was "a chief seat of the timber trade" in

¹Public Archives of Canada, Vol. 66, pp. 3482-85, John LeBreton to Major Hillier, April 5, 1824, quoted in S.J. Gillis, *op. cit.*, p. 88. No date for the cut is given.

²Public Archives of Canada, Vol. 70, pp. 3720-24, Charles Shirreff to Major Hillier, Jan. 29, 1825, quoted in S.J. Gillis, *op. cit.*, p. 8.

³W.H. Smith, Canada: Past, Present and Future. Being a Historical, Geographical, Geological and Statistical Account of Canada West (Toronto: F. Maclear, 1851), Vol. 2, p. 316.

the Ottawa River system.¹ The timber trade on the Rideau was also helped by the completion of the Rideau Canal. The Rideau's chief product was oak which will not float. William Pemberton, a timber merchant, testified before a select committee of the British House of Commons in 1835 that most of the oak timber going to the Quebec market was from the Rideau Country and that, in Britain, this oak was considered to be superior to any other Canadian oak.²

During the 1840's, the timber industry experienced tremendous expansion (Table 3.3). The combined production of white pine in the sub-regions of the Ottawa, the Gatineau and the Rideau Rivers almost doubled between 1844 and 1846. The increase in exports of white pine was phenomenal. For example, in 1842, about 8,000,000 cubic feet of white pine (mostly from the Ottawa Valley) were shipped from Quebec to ports in the U.K. By 1845, this figure had jumped by 100 per cent to nearly 16 million cubic feet (Table 3.3). Based on the average for 1844-1846, 26 per cent of total white pine production of the Ottawa Valley came from the Ottawa and its tributaries below Bytown, about 9 per cent from the Gatineau, 9 per cent from the Rideau, and the remaining 56 per cent from tributaries above the Chaudière (Table 3.1).³

¹Quebec Archives, QBC, Terres de la Couronne, Vol. 18, file 67, Charles Shirreff to W.B. Felton, Nov. 23, 1832, quoted in Gillis, op. cit., p. 93.

²Great Britain, Commons Select Committee on Timber Duties, 1835, p. 191. Quoted in S.J. Gillis, op. cit., p. 93.

³Figures for the Ottawa Valley in Table 3.1 are derived by adding the last four rows in each column. White pine figures for the Valley in Table 3.1 do not agree exactly with those in Table 3.3, because of the two different sources and also due to estimation involved in the calculation of figures in Table 3.3. Also, the figures in Table 3.3 relate to production while those in Table 3.1 relate to shipments. A part of the production figures might have been used in local consumption.

Table 3.3

Timber (White Pine) Exports from the Port of Quebec
to the U.K. Before 1851

<u>Year</u>	<u>Volume of Exports (Cubic Feet)</u>
1828	4,431,160
1832	7,717,760
1842	8,000,000
1844	11,950,438
1845	15,828,880
1846	14,392,220
1847	9,626,440
1848	10,709,680
1849	11,621,920
1850	13,040,520
1851	15,594,600

Source: Montreal Gazette, June 9, 1936,
I.D. Andrews, Second Report, and
the Journal of the Legislative Assembly,
1841, Vol. 1, 1842.

Note: More than 90 per cent of the shipments to the Port
of Quebec came from the Ottawa
Valley. Refer to Tables 3.1 and 9.3.

III.2.3 The Timber Industry and Its Spread and Multiplier Effects¹

The timber industry and later the sawn-lumber trade acted as a "dominant" sector for the economic development of Eastern Ontario during the first half of the nineteenth century. In view of the lack of statistical data on interindustry linkages, discussion of these linkages and the resulting income effects will be at a rudimentary level. Technological changes, size of the firms and their capital intensity will also be discussed.

The linkage and income effects of the timber industry were determined by its production function and by income it generated in consumer goods industries. Rapid growth of the timber industry meant an increased demand for labour and capital and for products of other industries. In the case of the demand for labour, the timber industry (including the timber-trade) attracted a large number both of migrant workers from other parts of the country and immigrants from other countries. It also attracted people like John Egan, Joseph Aumond, Allan Gilmour and the Hamiltons who were among the pioneering entrepreneurs of the timber trade in the Ottawa Valley. Capital to finance timber operations came mainly from British sources. The timber trade created a demand for capital goods such as axes, saws, ropes, chains, and other capital equipments used for cutting and rafting. Little is known, however, about the production of these non-agricultural goods in the first half of the nineteenth century, although Cynthia Craigie's study of the first half century of Hull Township shows that there was considerable local production of leather and axes.¹

¹C.H. Craigie, "The Influence of the Timber Trade and Philemon Wright on the Social and Economic Development of Hull Township, 1800-1850." Unpublished M.A. Thesis, Carleton University, 1969, pp. 109-112.

Linkages with the agricultural sector are clearer. As a matter of fact, agriculture in the Ottawa Valley, though started earlier than timber exporting, developed as a result of the expansion of the timber industry. Its expansion was geared to meet the food requirements of workers engaged in timbering and later in lumbering and also to meet the demand for hay, horses and oxen. The economic impact of the timber industry was highly beneficial to farmers in the vicinity because the trade provided a good local market at the highest price available anywhere in Canada.¹ The Bytown Gazette estimated that shanty operations on the Ottawa for the winter of 1839-1840 required 10,000 barrels of pork and fish, 15,000 barrels of flour, 3,500 tons of hay and 110,000 bushels of grain.² Several years later, at the peak of 1846, Thomas Keefer estimated that requirements had climbed to 18,000 barrels of pork, 19,800 barrels of flour, 7,200 tons of hay and 300,000 barrels of oats.³ The timberer's demand for agricultural goods was so high that almost every ton of surplus food was sold in Ottawa. Even the farmers along the lower parts of the Ottawa River who had easy access to Montreal did not look to that city; instead they brought their produce to Ottawa.

¹G.M. Craig, Upper Canada, The Formative Years, 1784-1841 (Toronto: McClelland and Stewart Ltd., 1963), p. 147.

²Bytown Gazette (December 5, 1839) cited in S.J. Gillis, op. cit., p. 143.

³Canada, Journal of the Assembly, 1847, App. LL, Reports of DPW quoted in S.J. Gillis, op. cit., p. 143.

John Egan & Co. between 1844-1848 employed annually 2,000 men, 1,600 horses and oxen. The men consumed 6,000 barrels of pork and the horses and oxen 1,200 tons of hay. Sessional Papers of Canada, 1852-1853, App. MMMM.

In addition to these agricultural commodities, there were many other manufacturing products, such as axes, ropes, chains, hay augers, cooking utensils, blankets and clothing, which were in great demand. These figures give an idea of the extent of spread and multiplier effects of timber operations on agriculture.

Timber operations helped agriculture in another way. Faced with a local demand for foodstuffs, the timber operators were encouraged to establish their own farms, which were operated on a large scale by experienced farmers.¹ This practice made farming business a profitable proposition. Further indirect evidence of increased profitability was a dramatic increase in acreage under cultivation between 1826-1851 (See Table 4.1).

Despite its efforts to be self-sufficient, the Ottawa timber trade was heavily dependent on imported goods from Britain, and later from the U.S.A. To that extent, the multiplier effects of higher demand for provisions and manufactures leaked away from the Region.

The timber trade also encouraged private and public investment in the improvement of natural waterways. In the early years, the rapids and falls between Bytown and Montreal delayed the arrival of timber rafts from the Ottawa Valley. To overcome these difficulties, dams and timber slides were built on all the major tributaries during 1840-1850. The invention of timber slides constituted a breakthrough as it enabled the timber cribs to pass through the falls without being broken up. By the middle of the nineteenth century, private interests had invested an estimated \$150,000 in such improvements in the Ottawa River System.² Numerous public investments

¹ S.J. Gillis, op. cit., p. 145

² Canada, Journal of the Assembly, 1853, Vol. 1. App. MMM, in S.J. Gillis, op. cit., p. 108.

were also undertaken to improve the Ottawa channel by building canals and slides (e.g., £10,300 in 1826, £10,000 in 1827, £37,000 in 1845-46).¹ All these investments had income- and employment-creation multiplier effects on the Ottawa Valley and the surrounding area. It is not known what proportion of them were felt on the Bytown side of the River.

Discussing the importance of the Ottawa area in the timber trade, the Canadian Economist put it as follows: "View it in what way you please, it [the Ottawa Region] is valuable. The timber trade is likely to prove of permanent importance ... and it gives a market at the door of the farmer for a good portion of the more bulky part of his produce, for his horses, cattle, hay, oats, beans, peas, potatoes and a portion of his wheat..."² In the same vein, Lord Elgin said in 1850 that the Ottawa region "is probably doing more at the present time than any other single section of the province to enable Canada to enter the market of the world as a purchaser."³ T.C. Keefer also testified to the prosperity of the Ottawa Region when he remarked, "I speak from experience when I say that I never saw elsewhere money more plenty (sic) and the means of comfort more universally diffused than on the Upper Ottawa."⁴ The timber industry had a great deal to do with the development of such lumber towns as Bytown (Ottawa), Pembroke, Hawkesbury, Belleville and Trenton. (See also the Chapter that follows on manufacturing industries). It enriched

¹Public Archives of Canada, MOLLQ Series, Vol. 187, Pt. 1, pp. 61-65, Cited in S.J. Gillis, op. cit., p. 104.

²The Canadian Economist (June 6, 1846).

³Despatch of August 16, 1853, quoted in A.R.M. Lower, Settlement and Forest Frontiers in Eastern Canada (Toronto: Macmillan, 1936), pp. 46-47.

⁴T.C. Keefer, Journals of the Assembly of Canada, 1847, Appendix LL., quoted in A.R.M. Lower, op. cit., pp. 46-47.

a considerable number of lumber kings, especially in the City of Ottawa. More than one member of this group contributed to the public life of Canada. Lower presumed that not all the fortunes that the lumber kings had built up were frittered away but that some of them, through investment, added to the total capital in Canada and helped build up her economy.¹

The timber industry, thus, acted as a leading industry in the first half of the nineteenth century. It was a fast-growing and innovative industry. It helped the growth of other interrelated industries such as agriculture, axe making, blacksmithing. However, the factors which created the demand for timber and the timber firms that exported timber to England were external to the Region. Most of these timber firms were branches of British firms which had their own independent fleets of timber ships. The use of these fleets created a negative entry in current account (services part) transactions of the Region. Consequently, profits of foreign firms dealing in square timber flowed out of the Region and some of the spread effects generated by the timber industry leaked out of the Region. Some of the regional centres like Bytown, Kingston and Pembroke experienced rapid growth during the timber trade era, but they did not act as regional growth centres because their growth was stimulated by the development of their hinterlands and not vice-versa. In other words, the hinterland acted as the propulsive force for the cities of the Region, the cities being reactors to growth in the hinterland. Furthermore, the positive effects of the timber trade on Eastern Ontario were not enduring. The Region did not translate them into a process of self-sustained industrialization when British demand dwindled and forest was used up. A large part of the profits from the timber and lumber operations passed into the hands of British merchants.

¹A.R.M. Lower, Great Britain's Woodyard (Montreal and London: McGill-Queen's University Press, 1973), p. 250.

III.3 The Sawn-lumber Industry: Early Beginnings

Sawn lumber and square timber operations went on at the same time. The early market for sawn lumber was largely local and limited. However, the differential duties imposed by Great Britain encouraged not only the square timber trade but also trade in deals. The deal-sawmills were different from earlier sawmills in that they sawed lumber to exact specifications in the form of planks four inches or more thick for the British market. A deal-sawmill was established in Eastern Ontario in Hawkesbury on the Ottawa River as early as 1804 by Charles Mears. By 1818, the deal-sawmilling industry was well established and its exports to Great Britain increased 400 per cent, from 2000 great hundreds in 1815 to 10,000 great hundreds in 1820.¹ In 1820, the biggest mill in Hawkesbury had 40 saws in operation and employed 40 men.² In 1850, the sawn-lumber industry exported 430,000 loads of deals to Great Britain.³

III.3.1 The Sawn-Lumber Trade with the United States

Exports of sawn lumber to the United States began in the middle of the 1830's. By the middle of the nineteenth century, lumber exports to the United States had reached a high level.⁴ The main reasons for the increase in the lumber trade with the U.S.A. were: rapidly growing demand in the United States for building materials, caused by phenomenal population growth in cities such as New York and Boston; the exhaustion of convenient native supplies in the U.S.A.; the decline in the exploitation rate of white pine forests in the Ottawa Valley near the middle of the 19th century that emphasized the need for other types of wood for other purposes, such as planks and boards;

¹S.J. Gillis, op. cit., p, 305-307.

²Ibid., p. 75.

³Ibid., pp. 305-307.

⁴In 1848, lumber exports to the U.S.A. amounted to £314,273, i.e., 26 per cent of the total value of forest exports. See A.R.M. Lower, The North American Assault on the Canadian Forest (Toronto: The Ryerson Press, 1938), p. 108.

Table 3.4(a)

Imports of Canadian Lumber
at Oswego

<u>Year</u>	<u>Amount Imported</u> (in feet)
1836	2,000,000
1840	1,909,000
1846	6,018,951
1849	44,157,000
1850	60,000,000

Source: Quebec Gazette, Dec. 9, 1850, cited in A.R.M. Lower, The North American Assault on the Canadian Forest, op. cit., pp. 99, 101, 116.

Table 3.4(b)

Wood Exports to the U.S.A. Through
St. John's, Lower Canada

<u>Year</u>	<u>Amount</u> (in ft.)
1834	2,000
1836	20,574
1838	34,000
1840	26,000
1842	17,000
1844	11,000

Source: Ibid., p. 97.

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Table 3.5

Number of Sawmills in Eastern Ontario
Planning Region, by District/County, For Selected Years

<u>District</u>	<u>County</u>	1826 No. of <u>Sawmills</u>	1831 No. of <u>Sawmills</u>	1836 No. of <u>Sawmills</u>	1841 No. of <u>Sawmills</u>	1851 No. of <u>Sawmills</u>	No. of <u>Employees</u>
Midland	Hastings, Lennox & Addington, Frontenac	74	93	86 Prince Edward	53 37	154	551
Johnston	Leeds, Grenville, Dundas	44	47	55	55	75	249
Eastern	Stormount Glengarry	31	30	41	37	46	88
Ottawa	Prescott Russell	10	7	19	20	17	61
Bathurst	Carleton Lanark	12	21	31	26	57 Renfrew 19	130 43
<u>Total - Eastern Ontario</u>		171	198	232	228	343	1122
<u>Total - Upper Canada</u>		425	595	902	968	1567	3670

Source: Canada, Department of Agriculture Census of Canada, 1665 to 1871, Vol. 4,
(Ottawa: 1876), pp. 198-199.

improvements in inland water transportation that provided links between Eastern Ontario and U.S. markets; and the need for substitute for markets in the U.K.¹

With the canals, the eastern districts of Eastern Ontario were now linked to American markets (through the Rideau Canal in conjunction with the Oswego feeder to the Erie Canal and the Champlain-Hudson-Chambly connection). Thus, in 1836, many of the people of the little backwoods settlement of Perth, on the edge of the Canadian Shield, turned their attention from getting out square timber for the British market to getting out saw logs for planks and boards for the Americans.² In 1836, two men alone shipped 2 million board feet to the U.S.A. The lumber which came along the Rideau as far East as the Ottawa was loaded at Kingston into schooners sailing for Oswego and taken down the Erie Canal.³ The Rideau Canal now provided a good deal of additional lake traffic for the port of Kingston, already among the busiest on the Canadian side of the St. Lawrence.⁴ The total trade flow from Eastern Ontario to the American market is not known, because no official statistics were collected on a regional basis at that time. However, figures for the imports of Canadian lumber at Oswego Port, U.S.A., and the amount of wood exports through St. John's, Lower Canada (Tables 3.4(a), 3.4(b)) give an idea of the exports to the U.S.A. Almost all the supply of lumber imports at Oswego came from the Ottawa and Kingston areas through the Rideau Canal

¹For a detailed explanation of these causes, see A.R.M. Lower, The North American Assault on the Canadian Forest, op. cit., pp. 89-102.

²A.R.M. Lower, The North American Assault on the Canadian Forest, op. cit., p. 99.

³Montreal Gazette (May 14, 1836) quoted in A.R.M. Lower, The North American Assault on the Canadian Forest, op. cit., pp. 99-100.

⁴W.H. Smith, op. cit., p. 188.

(Table 3.4(a)).¹ It is not clear what percentage of Canadian exports to the U.S.A. through St. John's, Quebec, came from areas in Eastern Ontario.

III.3.2 Impact of American Trade

Many sawmills were established in Eastern Ontario, especially in the Ottawa area, to meet the American demand for Canadian lumber. During the period 1831-1841, the Region recorded an increase of 15 per cent in the number of sawmills (Table 3.5). A very up-to-date mill with 30 saws was erected in about 1840 at the Rideau Falls by Thomas McKay who had made money as a contractor for the Lachine and Rideau Canals. In 1846, the mill shipped over 2.4 million board feet of lumber.² Around 1840, another sawmill was built by Alonzo Wright (on the Gatineau River). This mill had 28 saws (in 1851) and was capable of cutting 40,000 saw logs a year.³

As the deals trade with Great Britain and the sawn-lumber trade with the U.S.A. continued simultaneously for some time (i.e., 1841-1851), the capacity of existing mills expanded as a result of additional investment. By the middle of the century, investment in sawmills on the Ottawa River system was estimated to be about £ 180,000.⁴

¹ A.R.M. Lower, The North American Assault on the Canadian Forest, op. cit., pp. 104, 116.

² S.J. Gillis, op. cit., p. 105.

³ Ottawa Packet (December 15, 1849) quoted in S.J. Gillis, op. cit., p. 105.

⁴ Canada, Journal of the Assembly, 1853, App. MMM, PAC, MG 27, II, F7, Vol. 8, cited in S.J. Gillis, op. cit., p. 113.

Another major impact of the opening of American trade with the Ottawa Valley was an inward movement of American capital.¹ American capital brought with it many American citizens with innovative minds; notable among them were Captain J.J. Harris, H.F. Bronson, A.A. Baldwin, J.R. Booth, Levi Young, M.K. Dickenson, J.M. Currier, and E.B. Eddy.² Collectively, they were called the "American Colony".

III.4 Summary

The exploitation of forest resources of the Region started with a surge of Britain's demand for square timber. Other industries came into existence to satisfy the needs of the timber industry and the demand for general consumer goods. Agriculture expanded greatly as the demand for provisions, horses, and hay rose significantly. The forestry sector grew rapidly during the heyday of the timber trade. Thus, the resulting rapid economic growth of the Region in the first half of the nineteenth century is largely explained by the factors involved in the exploitation of forest resources, caused by foreign demand.

¹ Much of the initial American investment was made in the purchase of hydraulic lots in Bytown. See A.R.M. Lower, The North American Assault on the Canadian Forest, op. cit., p. 113.

² A.R.M. Lower, The North American Assault on the Canadian Forest, op. cit., pp. 113-114.

CHAPTER IV

Agriculture Prior to 1851IV.1 Early History of Agriculture

Apart from some "pre-contact" cultivation by Indians, agriculture in Eastern Ontario began with the coming of the French. But the real beginning of agriculture took place in the early 1780's, when the United Empire Loyalists¹ began emigrating from the newly independent United States to Upper and Lower Canada. Some of them settled in the Bay of Quinte and the Kingston area and along the St. Lawrence. They were rewarded by the British government with free land, seeds and gristmills.² With this British help and their own frontier experience, the Loyalists were in a position to support themselves within a few years of their arrival. They started growing wheat, rye, oats, peas, corn and squash. The Loyalists accumulated capital by selling the crops in excess of their own consumption to the Kingston merchants, and bought oxen, young cattle and other capital equipment to cultivate the land. A part of this agricultural surplus was consumed by the garrisons at Kingston, York and Niagara, and a part was shipped to Montreal. In 1794, the Kingston merchants shipped 12,823 bushels of wheat, 896 barrels of flour, and 83 barrels of middlings (biscuit flour) to Montreal, compared with 1,624 bushels of wheat and 3,596 barrels of flour

¹The Loyalists were those Americans who remained loyal to the British Crown. After the American Revolution, they had to move to the remaining British North American Colonies (now called Canada).

²The first gristmill to be erected by the government was on the Cataraqui River, about five miles upstream from Kingston. It was built around 1782. See W.S. Wallace, The United Empire Loyalists (Toronto: Glasgow, Brook and Company, 1922). Cited in Jacob Spelt, op. cit., p. 19.

that they furnished to the garrisons at Kingston, York and Niagara.¹ In 1801, the merchants of Kingston shipped down the St. Lawrence 13,963 barrels of flour and 350 bushels of wheat, the greater part of which again came from the districts about Kingston.² By 1800, Kingston had become a commercial centre for the agricultural community in the Region. A Kingston merchant wrote to his colleague in Montreal, "as long as the British government shall think proper to hire people to come over to eat flour, we shall go on very well and continue to make a future."³

Before 1800, only one part of the Region produced an agricultural surplus in excess of the local needs of settlers, i.e., the Bay of Quinte area. The Ottawa Valley above the Rideau River, and the counties of Prescott and Russell did not produce enough to meet local demand. Even the shipment of wheat to Montreal did not last long as the local demand for wheat had increased tremendously by the early 1830's because of rising timber operations in the hinterland of Kingston and in the Ottawa Valley.

IV.2 Agriculture and the Timber Trade

The prosperity resulting from the square-timber trade and, later on, sawn lumber, stimulated agriculture.⁴ Lumbering⁵ and farming in the

¹E.A. Cruikshank, "Cartwright to Simcoe," December 15, 1794 in Simpcoe Papers, Vol. III, p.23, cited in R.L. Jones, History of Agriculture in Ontario (Toronto: The University of Toronto Press, 1946), p.9.

²C.E. Cartwright, Life and Letters of the Late Hon. Richard Cartwright (Toronto: 1876), p. 82, cited in D. Creighton, op. cit., p. 121.

³C.E. Cartwright, "Cartwright to Todd Issac," October 21, 1792, in Life and Letters ... op. cit., pp. 49-50.

⁴The spread effects of the timber trade on agriculture have been discussed earlier. Only the general relationship between agriculture and the timber trade is examined here.

⁵Although the words "the timber trade" and "the lumber trade" have been used with different meanings, the word "lumbering" is used here in a broader sense to include "timbering".

Ottawa Valley proved complementary to each other. Lumber camps provided a market for food products, and farming provided food supplies, horses and hay to lumberers. The soil in the Valley was not fertile, and as the two activities of farming and lumbering were seasonal, the farmers combined lumbering during winter with farming in summer to supplement their income. The reason for their success was that they never wanted to become business entrepreneurs and, hence, stayed on their land, concentrating their efforts on growing hay, oats and wheat and raising cattle. Also whenever a conflict arose between farming and lumbering (i.e., conflict in terms of time spent on farming versus lumbering, in terms of the use of land for farming versus forestry as the land cleared by timber/lumber operations was not generally suited for agriculture in the Ottawa Valley), the farmers preferred farming.

But the conflict between farming and lumbering was not successfully overcome at all places in the Region. Glengarry County suffered more than any other part of Eastern Ontario from the unsuccessful attempt to combine lumbering with farming. Similar difficulties were encountered by farmers in Prescott and Russell counties until the 1850's.¹ On the whole, they went along together very well as two separate industries. Lumbering gave way to agriculture, however, at some places in the Ottawa Valley where the soil was good and where the initial impetus to agriculture had come from lumbering.

Settlers in the St. Lawrence sub-region did not aspire to combine agriculture with lumbering as the soil was sufficiently fertile to produce enough food for their own needs and for export. However, they supplemented their

¹C. Thomas, History of the Counties of Argenteuil, Quebec, and Prescott, Ontario, pp. 631, 639, 647, quoted in R.L. Jones, History of Agriculture in Ontario (Toronto: The University of Toronto Press, 1946), p. 9.

farm incomes by the sale of potash and pearl ash; later, during the timber trade era, the settlers sold timber to local merchants as they cleared their land. However, timbering was not their primary objective. It was, rather, a by-product of the process of clearing land for agriculture. The process of clearing land was quickened by the arrival of the timber trade.

IV.3 Field Crops and Dairy Products

During the first half of the nineteenth century, wheat was one of the main cash crops of the Region. In 1851, out of 663,428 acres of land under crop, 191,288 (28.8 per cent) were devoted to wheat production (Tables 4.1 and 4.2). The counties of Leeds and Carleton were the largest growers of wheat. The average yield of wheat per acre, however, was much lower in Eastern Ontario than in Central and Western Ontario (Table 4.2).

Besides wheat, other crops reported in the Census of 1851 included oats (136,802 acres), peas (70,644 acres), potatoes (31,393 acres), corn (21,493 acres) and barley (7,458 acres) (Table 4.2). All the crops of the Region had a lower yield per acre than the average yield in Southern Ontario and Central Ontario (Table 4.2). Except for potatoes and barley, Eastern Ontario also had lower yields per cultivated acre than Western Ontario. The difference in yield per acre between Eastern Ontario and other Regions of Southern Ontario does not seem to have been due to the small size of land under crops per occupier, but to differences in climate, the quality of the land available for cultivation, and methods of cultivation.¹ The fact that farmers in Eastern Ontario combined timbering with farming may be another reason for the low yield per acre.

Although peas, Indian corn, oats and barley had a large aggregate production, they were primarily consumed locally by shantymen and on the farms, and so were beans and wheat. But peas had some added commercial

¹ Section IV.4 shows that average land under crops per occupier in the Region was much higher than in Western Ontario, but yield per cultivated acre was much lower than that in Western Ontario.

TABLE 4.1

Land Under Cultivation and Cash Crops of Southern Ontario Regions, in 1826 and 1851

Region.	Total Land Occupied (acres)	No. of Occupiers	Land under Cultivation (acres)	Land under Crops (acres)	Land Under Cultivation Occupied per Occupier (acres)	Land Under Crops per Occupier (acres)	% of Total Occupied Land
				<u>1826</u>			
Eastern Ontario	1,429,831	- - -	251,508	- - -	- - -	- - -	17.60
Central Ontario	1,407,939	- - -	269,271	- - -	- - -	- - -	19.12
Western Ontario	515,883	- - -	78,964	- - -	- - -	- - -	15.3
Southern Ontario	3,532,653		599,744				16.98
				<u>1851</u>			
Eastern Ontario	3,209,596	30,526	1,093,853	663,428	35.83	21.73	34.8
Central Ontario	4,240,866	44,934	1,977,105	1,197,000	40.00	26.63	46.6
Western Ontario	2,350,993	24,436	642,919	442,500	26.31	18.11	27.3
Southern Ontario	9,801,455	99,896	3,713,877	2,282,928	37.17	22.85	37.9

--- figures not available

Sources: Canada, Department of Agriculture, Census of Canada 1867-1871, Vol. IV, (Ottawa: 1876), pp. 92, 194.

importance. They were exported to Great Britain, where they had to compete with peas produced along the Baltic and the Black Sea.¹ Oats, grown commercially in Lanark, Carleton and Prescott, were sold mostly to shantymen in the Ottawa Valley. Hay too was sold to lumbermen.

While exports of wheat going down the St. Lawrence expanded rapidly between 1840 and 1849, exports from Eastern Ontario declined² (see Table 4.3). The increase in wheat exports on the St. Lawrence ports, most of which came from Upper Canada, was attributed to good crops after 1830, especially in 1845, and to a marked augmentation in acreage of wheat in 1843 and 1845.³ The decline in exports from Eastern Ontario was due to the westward advance of the midge (a tiny insect that spoils the crops) from Lower Canada. It reached Cornwall probably before 1840, Brockville about 1842, and the Bay of Quinte in 1849.⁴ As it spread to the outermost settlements, the farmers in the St. Lawrence Valley had to abandon wheat as a staple. In Upper Canada as a whole, on the contrary, wheat had almost become a leading

¹ Journal of Agriculture (February 1849), p. 51, cited in R.L. Jones, op. cit., p. 81.

² According to the Census of 1851-1852, the production of wheat in Upper Canada had increased by 40 per cent between 1849-1850. The expansion occurred at a much more rapid rate than the expansion of population and took place in spite of the comparative failure of the crop in Eastern Upper Canada (Eastern Ontario) for several years before 1850.
Source: Census of the Canadas 1851-1852, Bureau of Registration and Statistics (Quebec: Lovell, 1853), Vol. 1, p. xxxii. The amount of wheat exported from Brockville declined from 210,000 bushels in 1843 to 44,000 in 1844. (Figures for Eastern Ontario as a whole are not available).

Source: Brockville Recorder, quoted in Toronto Examiner (August 3, 1842) and cited in R.L. Jones, op. cit., p. 138.

³ R.L. Jones, op. cit., p. 137.

⁴ Ibid., p. 138.

TABLE 4.2

Output of Selected Agricultural Commodities,
Southern Ontario Regions, 1851

Crops/acreage	Eastern Ontario	Central Ontario	Western Ontario	Southern Ontario (Total)
<u>Wheat</u>				
Acres	191,288	449,172	157,815	798,275
Output (000's of Bushels)	1892	8082	2709	12683
Output per acre	9.90	18.00	17.16	15.89
<u>Barley</u>				
Acres	7,458	17,752	4,919	30,129
Output (000's of bushels)	153	378	94	625
Output per acre	20.53	21.35	19.14	20.76
<u>Oats</u>				
Acres	136,802	197,368	78,888	413,058
Output (000's of bushels)	2806	6477	2112	11395
Output per acre	20.51	32.82	26.80	27.59
<u>Peas</u>				
Acres	70,644	89,693	26,310	186,643
Output (000's of bushels)	1010	1549	489	3028
Output per acre	14.30	17.27	18.59	16.22
<u>Corn (Indian)</u>				
Acres	21,493	27,087	23,467	72,047
Output (000's of bushels)	468	664	557	1689
Output per acre	21.76	24.59	23.74	23.45
<u>Potatoes</u>				
Acres	31393	33773	12800	77966
Output (000's of bushels)	2042	2243	688	4973
Output per acre	65.05	66.42	53.75	63.78

Source: Canada, Board of Registration and Statistics Census of the Canadas 1851-52 (Quebec: Lovell, 1853), pp. 60-63.

export product.¹ Some of the counties in modern Central Ontario devoted as much as two-thirds of the cleared land to the cultivation of wheat. T.C. Keefer was right in remarking: "there is probably no country where there is so much wheat in proportion to population and the area under cultivation as in that part of Canada west of Kingston."² In Eastern Ontario, however, agriculture was diversified, unlike that of Central and Western Ontario. It produced a variety of crops such as barley, oats, and potatoes in large quantities, and also dairy products such as butter and cheese. The diversification of farm products in Eastern Ontario was first made possible by demand from the shanty market.

Dairy Products

During the early years of settlement, the manufacture of butter and cheese was carried on as a household industry. They were sold to the local store-keeper only if there was any surplus. Dairy products in general were not produced on a commercial basis. The main reason, in the case of butter, was the limited size of the local market because almost every household kept cows and made butter on its own. Also, it was a perishable commodity and in the absence of refrigeration, could not be kept for a long period.

The low level of cheese production was due not to the low level of local demand but to cheap imports from the United States. At the prevailing prices of wheat and cheese, the farmers could make more money by growing wheat than by making cheese. But in Eastern Ontario, where wheat growing was not profitable, butter and cheese making was preferred to wheat growing.

¹In 1850, the exports from Canada West (before 1841, called Upper Canada) of wheat and flour constituted about 30 per cent of total exports of Canada West. See John McCallum, Unequal Beginnings: Agriculture and Economic Development in Quebec and Ontario Until 1870 (Toronto: University of Toronto Press, 1980), p. 48.

²I.D. Andrews, "Report on the Trade and Commerce of the British North American Colonies," House Executive Documents, 32nd Congress, 1st session, No. 136, (1852-1853), p. 408, quoted in R.L. Jones, op. cit.

TABLE 4.3Exports of Wheat and Flour¹ from the St. Lawrence

<u>Year</u>	<u>Quantity (Bushels)</u>
1812	451,303
1813	2,585
1814	6,086
1815	9,600
1816	5,675
1817	335,895
1820	535,893
1825	918,031
1830	948,826
1840	1,739,119
1845	2,507,392
1849	3,645,320

Sources: H.A. Innis and A.R.M. Lower, Select Documents in Canadian Economic History, (Toronto: University of Toronto Press, 1933), Vol. 2 pp. 265-266; and Hind, H.Y., et al., Eighty Years' Progress of British North America Showing the Wonderful Development of its Natural Resources by the Unbounded Energy and Enterprise of its Inhabitants (Toronto: L. Stebbins, 1968), p. 291.

¹The Table gives the combined exports of wheat and flour together in terms of bushels of wheat, one barrel of flour being regarded as equivalent to five bushels of wheat. The statistics provide an approximate index of Upper Canadian grain exports, given the difficulty of separating exports by production location.

By 1851, Eastern Ontario was producing butter and cheese commercially. In 1851, it manufactured 6,624,097 pounds of butter - about 39 per cent of the total butter output of Canada West (16,064,532 pounds). The county producing the most butter was Leeds (758,606 pounds), followed by Hastings (588,500 pounds), and Stormont (543,305 pounds).¹ The Region produced 473,700 pounds of cheese (20 per cent of the total cheese output of Canada West), with Leeds contributing 120,720, Hastings 102,825, and Glengarry 122,627 pounds.²

IV.4 Organization of Agriculture 1800-1851

Before 1851, agriculture in Eastern Ontario was carried on on a family basis. Of the total work force, 56 per cent was engaged in agriculture (Table 4.4). In Glengarry, Dundas, Carleton, Renfrew and Frontenac counties, more than 60 per cent of the work force was engaged in agriculture. The land under crop per occupier was smaller in the Region (22 acres) than that in Central Ontario, but larger than in Western Ontario (Table 4.1). The average size of unit of land under cultivation in the Region (35.36 acres) was larger than that in Western Ontario (26 acres), but smaller than that in Central Ontario (40 acres). An increase in the average size of the unit of cultivation took place in the second quarter of the nineteenth century due to the extensive method of cultivation, i.e., increasing or maintaining the existing level of output by bringing additional land under cultivation rather than by using more of other inputs. The land occupied increased from 1,429,831 acres in 1826 to 3,209,596 in 1851, an increase of 125 per cent over

¹Canada, Board of Registration and Statistics, Census of the Canadas 1851-1852, Vol. 2, op. cit., p. 65.

²Ibid., p. 65. All the figures relate to total production as opposed to marketed production.

TABLE 4.4
Occupational Structure, Eastern Ontario, 1851-52
 (Percentage of the Total Labour Force)

County & City	Agriculture	Industry	Tertiary Services	Total Including	
				Unclassified	Number
				Percentage	
Addington	56.01	21.99	6.35	100	2,978
Carleton	63.92	11.68	12.30	100	6,147
Dundas	66.62	13.93	7.78	100	3,418
Frontenac	60.59	16.32	14.15	100	4,981
Glengarry	66.73	13.22	5.88	100	4,470
Grenville	48.70	20.53	18.99	100	4,797
Hastings	54.76	24.20	10.20	100	7,665
Kingston City	12.00	37.80	43.54	100	3,622
Lanark	54.38	35.55	11.62	100	5,800
Leeds	57.33	19.76	10.74	100	8,536
Lennox	57.15	22.48	12.17	100	1,846
Ottawa City	17.41	35.12	36.70	100	2,240
Prescott	54.00	15.18	16.87	100	3,070
Prince Edward	55.93	15.18	7.98	100	5,015
Renfrew	62.67	13.13	13.61	100	2,505
Russell	56.78	28.13	9.38	100	981
Stormont	59.28	16.06	11.98	100	3,423
Total Eastern Ontario	55.87	20.30	13.77	100	71,494

Source: Adapted from Canada, Board of Registration and Statistics, Census of the Canadas 1851-1852, Vol. 1 (Quebec: Lovell, 1853), pp. 504-525.

N.B. There is no separate category for forestry.

25 years. Acreage of land under cultivation increased by 335 per cent during the same period (Table 4.1), while the population recorded an increase of 292 per cent during the same period.

IV.5 Summary

In the early part of the nineteenth century, agriculture in the Bay of Quinte and Kingston areas produced some surplus of a few crops, notably wheat and peas, beyond what was needed to meet settlers' food requirements and those of other local industries and services. This surplus was shipped to the Ottawa Valley and to Montreal. However, as the local demand increased, the surplus disappeared.

Agriculture in Eastern Ontario was diversified. The diversification of farm products was made possible by the shanty market. The yield per acre in Eastern Ontario was relatively lower than in other regions of Southern Ontario. Agriculture occupied more than half of the working population in the Region compared with 44 per cent in manufacturing, forestry and other industries.

CHAPTER V

Manufacturing Prior to 1851V.1 General

Manufacturing industries (apart from those carrying on hand production at home, called "cottage industries") in Eastern Ontario up to the middle of the nineteenth century were largely primary¹ in nature, and dependent on agricultural and forest resources for their inputs and falling water for their motive power. Primary manufacturing included both consumer and producer goods industries. There were some secondary manufacturers, which also included consumer as well as producer goods.²

Most of the manufacturing industries up to 1851, especially those producing consumer goods, such as breweries, distilleries, flour and grist-mills, and woollen and cotton mills, catered to the needs of local farmers and lumbermen. Industries producing producer goods were few in number, but those

¹The distinction between primary and secondary manufacturing industries in the Canadian context originated in one of the studies prepared for the Royal Commission on Canada's Economic Prospects by D.H. Fullerton and H.A. Hampson, Canadian Secondary Manufacturing (Ottawa: 1957), pp. 3-4. According to this study, primary manufacturing is distinguished by operations that involve either relatively minor processing of domestic resources, i.e., in which value added by manufacturing is relatively low, e.g., flour milling, cheese factories, sawmilling, etc., or those industries that are highly capital intensive and often complex that produce industrial materials from basic natural resources and sell them mainly in export markets. Later, in 1962, the concept was redefined and used by J.H. Dales in "Estimates of Canadian Manufacturing Output by Markets, 1870-1915," Papers, Canadian Political Science Association, Conference on Statistics, 1962-1963 (Toronto: University of Toronto Press, 1964), p. 77. Recently, the concept has been intensively used by J.M. Gilmour in his work, Spatial Evolution of Manufacturing in Southern Ontario 1851-1891 (Toronto: University of Toronto Press, 1972), p. 29.

²See Ibid., for classification of various industries.

that existed produced equipment for lumberjacks and farmers. Such industries manufactured saws and files, axes and edge tools (finished producer goods supplied to primary and tertiary sectors). They also included tanneries (unfinished producer goods), foundries, shipyards, carriage makers, saddlery and harness makers, and manufacturers of implements (finished producer goods). Some of the finished producer goods like carriages, saddles, and harnesses were also used as consumer durables.

To study the development of the manufacturing sector in the Region and its impact on the general level of economic development, a rudimentary analysis of linkage effects has been used here. In the absence of statistical information about inter-industry linkages during the first half of the nineteenth century, the above-noted classification of manufactured goods has been used to give some idea of the growth effects of the manufacturing sector.

In the literature, three types of linkages have been distinguished: backward, forward and residentiary.¹ Backward linkages result from an increase in demand for the product of an industry, A, which buys inputs from another industry, B. Expansion in industry B will, therefore, be directly attributable to backward linkage effects of an expansion of industry A. Since producer goods are inputs in the process of production, they can be considered to be a reflection of backward linkages. Forward linkages occur when the output of an industry is used as an intermediate input in other industries. In this case, growth of output of industry A will stimulate industry C which uses

¹For various theoretical and operational definitions of these linkages, see Albert O. Hirschman, The Strategy of Economic Development (New Haven and London: Yale University Press, 1958), pp. 98-119; Hollis B. Chenery and T. Watanabe, "International Comparisons of Structure of Production," Econometrica, Vol. XXVI (October 1958), pp. 587-521; Pam Yotopoulos and Jeffery B. Nugent, "A Balanced Growth Version of the Linkage Hypothesis: A Test," Quarterly Journal of Economics, Vol. LXXXVII, No. 2 (May 1973), pp. 156-171; and Daniel Todd, Polarization and the Regional Problem, Manufacturing in Nova Scotia, 1960-1973, Manitoba Geographical Studies 6, Department of Geography, University of Manitoba, Winnipeg, 1977, pp. 117-139.

A's output as an intermediate input. In this process, internal and external economies may result. Residentiary linkages result from the expansion of consumer demand caused by an increase in the income of workers. Residentiary links between consumers and consumer-goods producers are important for stimulating the consumer goods industries but not directly affect producer-goods industries.

V.2 Types of Manufacturing Industries and Their Output

The most important manufacturing industries in the Region up to the middle of the nineteenth century were: flour and gristmilling, sawmilling, woollen mills, carriage making, blacksmithing, axe and edge-tool making, tanning, and foundries. Manufacturing data for small enterprises meeting local needs and for a few deal-mills are limited in scope and coverage. There are no systematic and comprehensive data available for other industries before 1851. Table 5.1 shows that the number of flour and gristmills and sawmills for four censal years 1826, 1831, 1836 and 1841. In 1826, there were 425 sawmills in Upper Canada (which at that time approximated the area presently called Southern Ontario); 171 (40 per cent) of them were located in Eastern Ontario. By 1841, the number of sawmills in the Region had risen to 228, constituting 23 per cent of all sawmills in Upper Canada. In the case of flour and gristmills, the respective percentages for 1826 and 1841 were 42 and 25.

With regard to growth of establishments in the various districts, Ottawa experienced the highest rate of growth in the number of sawmills, while the Midland district witnessed negative growth in the number of sawmills, and flour and gristmills between 1826 and 1841.

Table 5.1

Sawmills and Gristmills, Eastern Ontario, By District 1826-1841

<u>District</u>	<u>Counties</u>	<u>1826</u>		<u>1831</u>		<u>1836</u>		<u>1841</u>	
		No. of Saw- mills	No. of Grist- mills	No. of Saw- mills	No. of Grist- mills	No. of Saw- mills	No. of Grist- mills	No. of Saw- mills	No. of Grist- mills
Midland	Hastings Lennox & Addington Frontenac	74	39	93	30	86	33	53	19
							P. Edward	37	21
Johnston	Leeds, Grenville	44	29	47	29	55	28	55	32
Eastern	Dundas, Stormont Glengary	31	19	30	21	41	19	37	19
Ottawa	Prescott, Russell	10	4	7	4	19	10	20	9
Bathurst	Carleton Lanark	12	14	21	21	31	29	26	18
(1) Total Eastern Ontario		<u>171</u>	<u>105</u>	<u>198</u>	<u>113</u>	<u>232</u>	<u>119</u>	<u>228</u>	<u>108</u>
(2) Southern Ontario		<u>425</u>	<u>249</u>	<u>595</u>	<u>292</u>	<u>902</u>	<u>372</u>	<u>968</u>	<u>427</u>
(1) as % of (2)		<u>40.23</u>	<u>42.16</u>	<u>33.27</u>	<u>38.70</u>	<u>25.72</u>	<u>32.00</u>	<u>23.55</u>	<u>25.29</u>

Source: Census of Upper Canada, Various Years, in Census of Canada 1665-1871, op. cit., pp. 92, 104, 120, 131.

N.B. Statistics on other manufacturing industries are not available before 1851.

Statistics for the number of employees, value of output, etc., are not available for these years which makes it hard to translate the growth or decline in the number of mills into the growth or decline of the manufacturing industries, as the size of plants is not known. However, in sawmilling, an increase in the number of mills represented growth, as is evident from the history of sawmilling in the Ottawa Valley before 1851 (See the Section on Sawn lumbering in Period I). Lower maintains that before the opening of the American market and technical progress associated with production of boards and planks for export, the increase in output of sawmilling came mostly through the increase in the number of mills.¹

A local sawmill required a capital between \$1000 and \$2000 and was generally financed by local investors. American capital became important in sawmilling only after American mills were located in the Ottawa area at the Chaudière Falls in the early fifties. With the exception of John Rochester, all the mill owners at the Chaudière Falls were Americans³ (See Period II for more on this).

The Census of 1851 provides statistics on all manufacturing industries, but unfortunately the statistics are incomplete and unreliable as many manufacturing establishments did not report (Table 5.2). Even those that reported, did not provide complete information on the number of workers, value of output, value of raw materials used, etc. Some firms reported employment but not the value of output, while others reported output but not employment.

¹A.R.M. Lower, The North American Assault ..., op. cit., p. 45.

²A.R.M. Lower, The North American Assault ..., op. cit., p. 44.

³Lucien Brault, Ottawa: Old and New, op. cit., pp. 177-178.

TABLE 5.2
Regional Manufacturing Comparisons, 1851-52
(in Pounds Sterling)

	No. of Estab- lish- ment	Reporting Establish- ments	Gross Value of Output	Capital Invest- ment	Workers Employed	Gross Value of Output per Es- tablish- ment	Capital per Es- tablish- ment	Employ- ment Per Establish- ment	Capital Per Employee	Output Per Employee	Value Added Per Employee	Value Added Per Employee	Ratio of Value Added to C. Output
	N ₁	N	£	(K)	(L)	£	£	£	£	£	£	£	
Eastern Ontario													
Cider Mills	168	59	383,800	73,150	140	6,505	1,240	2.37	522	2,741	78,303	550	.20
Saw Mills	359	140	51,400	44,160	523	367	315	3.73	84	98	23,970	45	.46
Carding & Fulling	58	26	9,360	12,400	43	360	476	1.65	288	217	2,820	65	.30
Woollen Mills	14	13	102,770	18,395	163	7,905	1,415	12.54	113	630	45,213	277	.44
Distilleries	12	--	--	--	--	--	--	--	--	--	--	--	--
Tanneries	67	32	49,420	31,020	130	1,544	975	4.06	239	337	21,590	167	.50
Foundries	17	10	12,510	32,660	128	1,251	3,266	12.80	255	97	7,932	62	.64
Central Ontario													
Cider Mills	328	152	1093,650	267,250	433	7,080	1,750	2.85	617	2,520	196,950	450	.18
Saw Mills	932	303	138,030	120,080	1138	455	396	3.75	106	121	65,730	57	.48
Carding & Fulling	58	23	9,860	10,540	56	428	458	2.63	188	175	2,380	82	.34
Woollen Mills	47	21	157,820	29,210	202	7,515	1,390	9.62	145	781	75,977	376	.48
Distilleries	54	--	--	--	--	--	--	--	--	--	--	--	--
Tanneries	100	44	42,650	16,750	182	969	380	4.130	92	234	16,700	91	.39
Foundries	52	27	72,980	45,225	462	2,700	1,675	17.111	98	157	51,090	110	.70
Western Ontario													
Cider Mills	187	34	122,190	57,340	70	3,594	1,690	2.05	819	1,746	25,600	360	.21
Saw Mills	244	79	61,420	31,510	286	7,707	398	3.62	110	214	24,680	86	.40
Carding & Fulling	23	--	--	--	--	--	--	--	--	--	--	--	--
Woollen Mills	12	8	22,170	8,250	62	2,770	1,030	7.75	133	357	9,770	157	.44
Distilleries	28	--	--	--	--	--	--	--	--	--	--	--	--
Tanneries	41	18	7,850	10,450	63	436	580	3.50	166	124	3,827	60	.49
Foundries	18	9	16,073	11,300	72	1,786	1,255	4.50	157	223	11,524	160	.72

Source: Canada, Board of Registration and Statistics Census of the Canadas, 1851-1852
Vol. 2, OP. cit., pp. 170-259.

Note: Value of output in some cases has been derived by multiplying physical quantities by their corresponding prices per unit. See footnote on page 71 for the method of calculating the value added figures.

The situation was similar in the case of value of capital. Statistics compiled for this study and presented in Table 5.2 are based only on firms that reported capital, output, and employment.¹

From Table 5.2 it is obvious that sawmills were the largest single industry, measured by employment, followed by woollen mills, flour and gristmills and tanneries. There were 359 sawmills in Eastern Ontario (23 per cent of the total in Southern Ontario). Only 140 of them filed returns on output, capital, and employment. About 90 per cent of the reporting flour and gristmills, and sawmills were run by falling water power. The sawmills that reported both output and employment, employed 523 workers, whereas those that reported either output or employment, employed 867 workers (not shown in Table 5.2). This indicates the incompleteness of the census data. Similar gaps were found in other manufacturing industries.

With the exception of woollen mills and tanneries, the average size of the manufacturing establishments (based on gross output of reporting firms) in Eastern Ontario was smaller than that of establishments in Central Ontario, but larger than that in Western Ontario. With the exception of sawmills, and flour and gristmills, the average size of reporting establishments measured by the amount of capital invested was larger in Eastern Ontario than that in both Central and Western Ontario.

¹ An alternative would have been to estimate the statistics for firms that did not report. This was not chosen for the following two reasons: (1) The proportion of firms not reporting was so large that estimates for them might have utterly distorted the actual values (not known); (2) the purpose of Table 5.2 is to compare the manufacturing structure and performance of Eastern Ontario with other regions of Southern Ontario and this did not necessarily require complete figures for all firms, assuming an equal degree of non-reporting firms in all the regions.

The average size of all manufacturing establishments measured by the number of employees was smaller in Eastern Ontario than in Central Ontario, but larger than in Western Ontario.

The average value added¹ per employee in flour and gristmills, carding and fulling mills, and tanneries in Eastern Ontario was greater than the average value added per employee in Central Ontario and Western Ontario; the situation was the reverse in the case of sawmills. The average value added per establishment in the woollen industry in Eastern Ontario was greater than in Western Ontario but smaller than in Central Ontario. The capital-labour ratio (K/L) in three industries (carding and fulling, tanneries, foundries) was higher in Eastern Ontario than in either Central or Western Ontario, and lower in flour and gristmills, sawmills and woollen mills.²

V.3 Spatial Distribution of Manufacturing

With the exception of sawmilling in Ottawa and Hawkesbury, there was no major concentration of manufacturing industries in Eastern Ontario in the

¹Value added in Table 5.2 was calculated by subtracting the value of raw materials used from the value of output. Since the Census of 1851 did not report the value of raw material used, this was estimated by applying the trend of ratio of raw materials to gross value of output in each industry for various counties for the Census years 1871, 1881 and 1891. The gross value of output was calculated by multiplying the volume of output by the corresponding price levels of various commodities. To this was added a part of output which was reported in pounds sterling, because some establishments reported their output in quantity of goods produced, while others reported in pounds sterling. This method reflects the effects of technological changes implicit in the decline of the ratios between 1871, 1881 and 1891. However, it suffers from the cyclical and seasonal variations in prices of raw materials and final products.

²Economies of scale for these industries were also estimated by fitting both constrained and unconstrained Cobb-Douglas production functions and using cross-section manufacturing data for counties for the year 1851. Preliminary results indicated that with the exception of foundries and sawmills, most of the manufacturing industries in Eastern Ontario experienced increasing returns to scale, while economies of scale in most of the manufacturing industries in Central and Western Ontario exhibited decreasing returns to scale. However, poor quality of data made it impossible to consider these results significant. Hence, they are not reported here.

first half of the nineteenth century. Most of the manufacturing establishments, except shipyards in Kingston, served local markets and were, thus, found in almost every settlement of the Region. A brief statistical history of some of these settlements may be found in the Appendix.

Ottawa (Bytown)

Although Ottawa (formerly Bytown) has grown since 1858 mainly as a government-based centre, its earlier history indicates that it developed as a lumber town during the period of the timber trade in the nineteenth century. Manufacturing during the first half of the nineteenth century merely satisfied the local demands of settlers, lumbermen, farmers, and other traders. Flour and gristmills, sawmills, blacksmithies, axe and saw making, carriage works, woollen mills, and foundries seem to have been the important manufacturing industries of Ottawa, though reliable data on manufacturing for the City are not available before 1851. According to the Census of 1851, there were 30 manufacturing establishments in Bytown, five tanneries, four sawmills, three flour and gristmills, five carriage factories, two cabinet makers, two foundries, one woollen mill, one distillery, one brewery, one pot and pearl ashery, and five other manufacturing establishments¹ (See Manufacturing Profile of Ottawa in the Appendix. With the exception of foundries, carriage works and sawmills, all the manufacturing establishments produced consumer goods, i.e., they were industries resulting from the final demand linkage effects of the timber trade and other lumber operations and farming. There were not very many producer goods industries which could be created by backward linkage effects. Bytown had no axe and edge-tool establishment, though it had five

¹ These included: boots and shoes, a paper mill and a tin producer.

carriage factories.

Despite several sawmills, flour and gristmills, and other industries, Bytown could not be classified as the industrial centre of the Region. It was mainly a timber town and most of the manufacturing establishments catered to the needs of farmers and the workers in the timber trade. However, a part of the area called New Edinburgh (now a part of the City of Ottawa) could be called an industrial "estate",¹ as a large number of flour mills, sawmills, and a cloth factory sprang up in the 1840's about the Rideau Falls.² There were also a couple of establishments located at the Chaudière Falls. The spread effects of these industries seem to have been local, as the sources of supply and demand (except sawmills, where demand was mostly external) were also local. Furthermore, the establishments located at the Rideau and Chaudière Falls were not inter-related through purchases of each others' outputs/inputs.³ They came to be located at one place because of water power provided by the Falls.

Kingston

Manufacturing in Kingston was in keeping with its administrative, defence, transshipment, and port functions. According to the Census of 1851, Kingston had 36 manufacturing establishments comprising seven sawmills, two gristmills, one distillery, one brewery (the largest establishment with 50 employees), one tannery, two foundries, a shipyard, two pot and pearl asheries,

¹The concept of an industrial estate should not be confused with an industrial complex. The industrial units composing industrial estates may not be inter-connected apart from sharing infra-structural or auxiliary facilities, while intimate technological and interindustry interdependencies are the salient features of industrial complexes.

²The Ottawa Journal (October 23, 1971).

³To the extent that the use of falling water for, say, a flour mill reduced the motive power for a sawmill, these two mills could be considered as indirectly interdependent on each other.

and 19 others including cabinet ware, sash, door and blind factories, glue factories, sewing machine works, and rope factories. Breweries and distilleries reflected the induced demand effects of income spent by the military and civilian population, while shipbuilding and rope making were backward linkage effects of the port functions of Kingston which, in turn, were backward linkage effects of wheat and flour exports and the exports of other products such as lumber. Gristmills were consumer goods industry set up to satisfy the local demand; even sawmills before the opening of the American lumber trade were serving the local market for construction activity. The growth of these industries slowed down and in some cases became negative with the slackening of population growth of Kingston after 1844 (when the Capital of the United Province of Canada moved from Kingston). Kingston was by no standard an industrial centre, but it did serve the manufacturing needs of the garrison and the hinterland quite well.

Belleville

The first manufacturing establishment in Belleville was a lumber mill erected in 1790 with a dam on the River Moira. In 1831, a paper mill was set up.¹ The 1851 Census recorded three gristmills, three sawmills, two woollen mills, one distillery, one tannery, and two breweries. Gristmills and sawmills accounted for more than 50 per cent of the total manufacturing employment in Belleville. Most of the manufacturing establishments were producing consumer goods for local consumption.

Cornwall

In the early nineteenth century Cornwall developed as the administrative seat of Stormont County and as a port on the St. Lawrence. Later on, it

¹Jacob Spelt, op. cit., p. 77. This was the first paper mill of the Region, and of course, used rags as raw materials.

developed an industrial base consisting of asheries, gristmills and flour mills.

The Census of 1851 reported thirteen manufacturing establishments in Cornwall - six asheries, one gristmill, one sawmill, one distillery, one tannery, one foundry, one soap factory, and one candle factory. It is interesting to note that the present dominance of chemical industries in Cornwall goes back to the middle of the last century. Six asheries presumably provided input to soap making, chemical industries, and tanneries. Initially, ashes were exported to Britain and later were used locally in tanneries and chemical industries.

Brockville

According to the Census of 1851, the census division of Brockville reported eleven manufacturing establishments: five tanneries, three sawmills, one gristmill, one foundry, and one carding and fulling mill, giving employment to 92 workers. As in the case of other port cities of Eastern Ontario, most of the manufacturing establishments supplied local demand for consumer goods and services.

Trenton

The first manufacturing establishment set up in Trenton (Trent Port as it was called at that time) was a gristmill in 1794, four years after its settlement by the United Empire Loyalists. In 1807, a gristmill was located at Stirling and in 1820 a mill was built at Marmora. There are no census data for Trenton, but the works of Spelt¹ and Canniff² show that Trenton had

¹Jacob Spelt, op. cit., p. 122.

²William Canniff, The Settlement of Upper Canada (Belleville, Ontario: Mika Silk Screening Limited, 1971).

gristmills, sawmills, and woollen mills. The lumber industry was the main reason for the growth of Trenton..

Manufacturing in Other Small Centres

Other minor places in the Region developed either as ports (e.g., Prescott and Picton), lumber towns (Hawkesbury and Pembroke), or as woollen mill centres (Carleton Place and Almonte). The port towns of Prescott and Picton specialized in boat making. Hawkesbury specialized in sawmilling.

Pembroke, initially as a fur trade centre and then a lumber town, benefitted from the backward linkage effects of fur trade and lumber operations. It provided foodstuffs to fur traders and lumbermen. It also provided capital equipment such as saws, axes and files.

Carleton Place and Almonte were the two centres of the Region based on woollen mills. The settlement of Almonte actually began with the establishment of a sawmills and a gristmill on the Mississippi River in 1819.

V.4 Concluding Remarks

Since most of the places in the Region developed as points of transportation, ports, administrative and garrison centres, and timber towns, the majority of the manufacturing establishments that came into existence in the first half of the nineteenth century were "consumer-oriented". Unlike "propelling" industries, they were based on primary production. In the absence of efficient means of transportation, they produced mostly for local markets, which were limited¹ because of the lack of general purchasing power of the people.

¹Sawn-lumber mills were the possible exception.

Sawmills and flour mills, however, did produce for export markets. In general, the growth of manufacturing industries was very closely linked with the fortunes of agriculture and lumbering. The pattern of their spatial distribution was determined by the distribution of population and the availability of water power and transport routes. There was no significant concentration of manufacturing activities in any single centre or any group of urban centres, except sawmilling at Bytown. However, Kingston led the Region in terms of manufacturing employment and the number of manufacturing establishments. Manufacturing establishments in Eastern Ontario did quite well in relation to their counterparts in other regions of Southern Ontario. Their size and value added per worker were larger than those in their counterparts in other regions of Southern Ontario.

CHAPTER VI

Government Sector Prior to 1851

Since the early nineteenth century, the government sector in Eastern Ontario has been an important source of employment and economic stimulus. The history of government activities in the Region goes back to 1673 when the French built Fort Cataraqui (later Fort Frontenac) to control the Iroquois and protect the fur trade. The Region felt the first substantial impact of the government sector in 1783 when a British stronghold was established at Kingston, and a naval base was transferred from Carleton Island (U.S.A.). During the War of 1812, fortification activities were intensified. Kingston alone had a garrison of 2,000 men.¹ Another fort was built at Prescott during the war to protect the village from possible American attack. There was yet another military post at Cornwall. Statistics on the strength of the military posts in 1814 indicate that Prescott and Cornwall each could muster 400 soldiers.²

As a result, Kingston and surrounding areas experienced economic growth in the early part of the nineteenth century. The increased demand of soldiers for food and other consumer goods brought many industries into existence, viz., flour and gristmills, textile mills, shoemaking, breweries, and distilleries. It also provided a market for farmers around Kingston and the Bay of Quinte, and, thus, quickened the process of agricultural settlement.

¹Brian S. Osborne, "Kingston in the Nineteenth Century: A Study in Urban Decline," in J.W. Wood (editor) Perspectives on Landscape and Settlement in Nineteenth Century Ontario, Carleton Library No. 91 (Toronto: McClelland and Stewart Limited, 1975), p. 163.

²Report on the Canadian Archives, 1896 (Ottawa: Printer to the Queen's Most Excellent Majesty, 1897), p. 5.

The government sector in the Region was expanded in 1841, when Kingston was chosen as the Capital of United Canada. As a result, Kingston experienced a population increase, the magnitude of which can be estimated from the fact that it lost 1,700 people in 1844 when the Capital of the United Canada was moved alternately to Toronto and Montreal.

Construction of the Rideau Canal (1826-1832) was another government activity undertaken during this period. It provided employment to about 2,000 construction workers most of whom resided in Bytown. It also created a demand for construction materials, food and other consumer goods.¹

In sum, the government sector consisting mainly of garrison and other government activities was concentrated in or around Kingston. It greatly affected the settlement pattern of the Region, as the earlier settlements came into existence around forts and along the canals.

¹ See Chapter II for more detailed effects of the Rideau Canal on the economy of Eastern Ontario.

CHAPTER VII

Early Settlement and Population Growth Prior to 1851VII.1 The Beginnings

The effective settlement of Eastern Ontario did not begin until 1783 when Loyalist refugees arrived from the American Colonies.¹ The British government designed the settlement process so as to solve both the problems of settling the Loyalists and providing the Colony with adequate protection against a possible attack by the Americans. The government granted land to the Loyalists near Fort Frontenac so that the settlement could be easily defended in case of attack. It was hoped that the military strength of the Fort would be reinforced by settling the Loyalists along the frontier as some of them were disbanded soldiers from the American Colonies, and had previous military training. It was also hoped that the nearby naval post and garrison would provide the new settlements with a market for their products.

This type of "directed" or "planned" settlement fitted into Governor Simcoe's view of development, according to which the best way to develop a settlement was to select a site with natural advantages and a strategic position such as a confluence of rivers, harbour, the beginning or end of a portage, and then to station troops in its vicinity. This would create a market for farm products, which would attract settlers to the district, as was demonstrated so successfully by the harbour of Kingston and its garrison.²

¹Before 1783, there were some small and scattered communities inhabited by Algonquins, but there is no complete record of them.

²Jacob Spelt, op. cit., p. 28.

In 1783, about 370 soldiers led by Major Ross prepared a site for the future city of Kingston. In 1784, the population rose to 2,000 but soon dropped to 400 as the majority of the settlers went to the surrounding areas.¹

VII.2 Settlement Along the St. Lawrence Lowlands and the Bay of Quinte

The area between the Bay of Quinte and Kingston was first to be settled by the Loyalists. The settlement around the Bay of Quinte was based primarily on agriculture, while Kingston was a mixture of farming, government, and commercial communities. Settlement along the St. Lawrence commenced in 1783 with the survey of ten townships ("Cataraqi townships" as they were called) in the following order: Kingston, Ernestown, Fredericksburg, Richmond, Adolphustown, Sophiasburg, Ameliasburg, and Marysburg, Sidney and Thurlow. From there, the settlement moved toward the West. The first gristmill of Upper Canada was erected by the government on the Cataraqi River, about five miles upstream from Kingston.² In 1787, another mill was built near Napanee, and until 1796, it was the only mill west of the one on the Cataraqi River.³ By 1797, settlement had expanded to the Bay of Quinte area. Unlike the Ottawa Valley area, lumbering was not a major factor in the settlement of the St. Lawrence - Bay of Quinte area. Settlement in this area was induced by government activities (i.e., Fort Cataraqi and the naval base in Kingston), and by incentives provided by the government in the form of grants of free

¹B.S. Osborne, "Kingston in the Nineteenth Century: A Study in Urban Decline," in J.W. Wood, editor, op. cit., p. 160.

²W.S. Wallace, The United Empire Loyalists (Toronto: Glasgow, Brook and Company, 1972), cited in Jacob Spelt, op. cit., p. 19.

³W.S. Harrington, History of the County of Lennox and Addington, (Belleville, Ontario: Mika Silk Screening Limited, 1972), p. 41.

land and the construction of gristmills.

At the same time, settlement also began in the area now occupied by the counties of Glengarry, Stormont, Dundas, Grenville, and part of Leeds County. Nine townships, the "Royal Townships" as they were called, were surveyed in 1784.¹ These townships were: Lanchester, Charlottenburgh, Cornwall, Osnabruck, Williamsburgh, Matilda, Edwardsburgh, Augusta, and Elizabethtown (later Brockville). Charlottenburgh, Cornwall, Osnabruck, Williamsburgh, and Matilda were settled mostly by officers from the First Battalion of the King's Royal Regiment of New York. The first gristmill and sawmill at Williamsburgh were erected in 1790.²

The construction of the Rideau Canal expanded settlement around Kingston. Expansion, however, was restricted because the surrounding area was mostly the hard rock of the Canadian Shield, and, therefore, not suited for agriculture. Expansion of the settlement in the Bay of Quinte area was also limited by the Shield. However, its population density increased because it was one of the oldest settlements in the Region and had the attraction of good agricultural land in a number of places.

VII.3 Settlement of the Ottawa Valley

Settlement of the Ottawa Valley sub-region of Eastern Ontario can be considered the second phase in the process of development, the first being

¹ Nicka and Helma Mika, United Empire Loyalists, Pioneers of Upper Canada (Belleville, Ontario: Mika Silk Screening Limited, 1976), pp. 155-156.

² Ibid., p. 156. Mention of flour and gristmills, and sawmills is made because they may indicate settlement and development. Mill sites attracted settlers and soon became nuclei around which a village was formed. For example, in the 1790's, a sawmill and gristmill were established by John W. Meyer on the Moira River, around which a village sprang up called Meyers' Creek (now Belleville).

settlement along the St. Lawrence and the Bay of Quinte area. Though the Ottawa Valley was visited by Champlain in 1613, and later by other fur traders and missionaries, it was not actually settled until the beginning of the nineteenth century.

In 1800 Philemon Wright set out to farm land at the foot of the Chaudière Falls on the North side of the Ottawa River near present-day Hull. The settlers realized soon the need of a cash crop to earn money for the purchase of consumer goods. Following the success story of Philemon Wright, they found that they could float timber down to Quebec and sell it for cash.

It was, thus, the timber-trade operation that acted as a great motivating force for settlement in the Ottawa Valley; agriculture merely expanded to supply these operations. Some small manufacturing establishments such as flour and gristmills, sawmills, and blacksmithies, were set up to meet the local demand of lumbermen and agriculturalists. Manufacturing thus reinforced the settlements, induced by the timber trade and supported by agriculture.

The process of permanent settlement of the Ottawa Valley and along the Rideau River was boosted after the War of 1812, when the British government encouraged settlement by the disbanded military men and some Loyalists who had earlier moved North from the St. Lawrence. Further impetus was provided to settlement by the construction of the Rideau Canal in 1826-1832. Several settlements (e.g., Perth, Merrickville, Bytown) along the Canal experienced an enormous increase in population.¹ In brief, settlement of the Ottawa Valley was initiated and fed by the exploitation of forest resources and public projects undertaken by the government.

¹See above Chapter II for more on this point.

VII.4 Settlement of the Pre-Cambrian Shield

As the Shield portion of Eastern Ontario is uninviting from the viewpoint of agriculture, its settlement did not begin until other parts of the region had been taken up. Even after that the settlement of this sub-region was patchy, i.e., limited to only those pockets of land that were of some use for farming. Attempts to settle the area agriculturally without consideration of the type of soil proved to be failures.

By 1830, farming had extended to the Renfrew Lowlands because of the movement of lumbering operations up the Ottawa River. Settlement in this area followed the major tributaries of the Ottawa. The "Frontenac Axis" and the "Hastings-Renfrew Bridge" were two areas in the Shield that were settled as a result of pressures and patterns of settlement in the South (i.e., the St. Lawrence Lowlands).¹ Basic factors that influenced the pattern of settlement were: (1) physiography; and (2) colonization roads that helped settlement of places remote from waterways but with fertile land. On the whole, the settlement of the Shield area was limited to fertile pockets of land accessible to the St. Lawrence Lowlands. Settlements elsewhere in the Shield did not prove successful.

VII.5 Population Growth

In 1825, what is now Eastern Ontario had the largest population of any region of Southern Ontario. The inhabitants numbered 72,125 and constituted

¹ J.H.B. Richards, "Agricultural Patterns in the Pre-Cambrian Area of Southern Ontario," The Canadian Geographer, No. 5 (1955), pp. 63-70.

46 per cent, of the total population of Southern Ontario. The respective figures for Central Ontario were 65,757 and 42 per cent, while those for Western Ontario were 20,041 and 13 per cent (Table 7.1).

The Region continued to hold the first rank in the population of Southern Ontario up to the early 1830's. But its relative share of the total population of Southern Ontario began to dwindle in the 1830's. In 1835, its population fell to 39 per cent of the total compared to 47 per cent and 14 per cent for the Central and Western regions respectively (Table 7.1). This was because of the rise of Toronto.

Even so, the population of Eastern Ontario grew very fast in absolute terms between 1825 and 1851. It almost tripled during this period. Its growth rate, however, was slower than that of the Central and Western regions of Southern Ontario. This was simply a part of the normal process of Westward moving settlement - not any decay in Eastern Ontario. The compound growth rate of Eastern Ontario over the period 1825-1851 averaged 5.3 per cent, compared to 7.9 per cent and 9.06 per cent, respectively, for Central and Western Ontario, and 7.15 per cent for Southern Ontario as a whole (Table 7.2). The higher growth rates in Western Ontario were because of its relatively lower initial population than that of Eastern Ontario.

VII.6 Urban Growth and Regional Development

The total urban population was very small up to 1851. In the Canadas as a whole, only 15 per cent of the population lived in incorporated cities. For Canada West, the figure was 16.2 per cent. There were no interrelated or interdependent urban systems. The urban centres in Eastern Ontario grew mostly as ports, timber towns, administrative centres, and garrison towns.

In 1825, one city - Kingston - was the leading centre in all of Upper Canada, with a population of 2,250. It grew more than 50 per cent between

TABLE 7.1

Population Growth of Eastern Ontario Vis-à-Vis Other Regions
Of Southern Ontario, 1825-1851

Region	1825	Rank	1830	Rank	1835	Rank	1840	Rank	1851	Rank
Eastern Ontario	72125	1	95770	1	134045	2	153837	2	283354	2
Central Ontario	65757	2	90491	2	164803	1	211048	1	474908	1
Western Ontario	20041	3	26895	3	48541	3	67274	3	193475	3
Total (S. Ont.)	157923		213156		347389		432159		951697	

Percentage of Total Population of Southern Ontario in Each Region

	1825	1830	1835	1840	1851
Eastern Ontario	45.67	44.93	38.58	35.60	29.77
Central Ontario	41.64	42.45	47.45	48.83	49.90
Western Ontario	12.69	12.62	13.97	15.57	20.33
Total (S. Ont.)	100	100	100	100	100

Source: Calculated from Census of Upper Canada, 1825, 1830, 1835, 1840, 1845-58, in Canada, Department of Agriculture, Census of Canada 1870-71, Vol. 4, (Ottawa: 1876), pp. 86, 102, 119, 128, 180.

TABLE 7.2

Population Growth Rates of Eastern Ontario Vis-à-Vis Other
Regions of Southern Ontario, for Various Periods

Period	1825-30	1830-35	1835-40	1840-51	1825-1851	1825-31 (Compound growth Rate)
Region						
Eastern Ontario	32.78	39.96	14.76	84.16	292.0	5.3
Central Ontario	37.60	82.12	28.06	125.00	622.00	7.9
Western Ontario	34.19	44.59	38.59	187.00	865.39	9.06
Southern Ontario (Upper Canada)	34.90	62.97	24.40	1.20	502	7.15

Source: Calculated from Table 7.1

1825 and 1830. The main reason for its rapid growth was the opening of its hinterland, the construction of the Rideau Canal. Other factors responsible for the expansion of Kingston were: (1) the fortification of Kingston after the War of 1812, and (2) the increase in port functions because of the expansion of the wheat trade and the arrival of the timber trade on the St. Lawrence. It also served as a major point of transshipment for cargoes to be transferred between lake schooners or steamers onto smaller boats that could navigate the rapids of the St. Lawrence. As a result, Kingston had become the commercial capital of Upper Canada by 1830. Many merchants and their agents moved to Kingston to take advantage of increased traffic on the St. Lawrence. Even in 1851, Kingston was still the biggest exporter and the second largest importer of goods to and from the U.S.A. in Upper Canada (Table 7.3). In terms of total value of exports handled by the Upper Canadian ports in 1850, the port of Kingston was second only to that of Hamilton (Table 7.4). However, in terms of the value of imports handled, it was the third largest, following Toronto and Hamilton.

Thus, Kingston grew fast in the first quarter of the nineteenth century due to its functions as a port, administrative centre, and point of transshipment. It could not, however, act as a growth-inducing centre for the Region as a whole; rather its growth was stimulated by the opening of its hinterland.

Even as a place providing various services to its hinterland, Kingston had a short-lived dominance over the Region. Its importance began to dwindle after the 1830's when its competitor, Toronto, took the lead and never looked back. In 1830, Kingston had a population of 3,578; its rival, Toronto, had 2,680 inhabitants. In 1835, Toronto had a population of 13,099, compared with

TABLE 7.3

Trade of Cities of Southern Ontario with the U.S.A.
in 1851, in Pounds Sterling

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	Imports from the U.S.A.	Exports to the U.S.A.
Kingston*	743,232	421,016
Bath*	9,384	21,428
Napanee*	22,120	43,196
Belleville*	98,524	147,368
Trenton*	-----	-----
Picton*	42,732	17,808
Milford	1,584	10,480
Wellington	2,352	22,884
Colbourne	7,496	944
Grafton	-----	-----
Cobourg	125,464	71,612
Port Hope	71,728	100,408
Newcastle	3,928	-----
Darlington	14,676	29,960
Whitby	26,456	201,164
Toronto	1,525,620	327,368
Port Credit	8,556	181,268
Oakville	40,760	122,880
Penetanguishene	252	3,736
Sutton	3,984	-----

Source: I.D. Andrews, Report on the Trade and Commerce of the British North American Colonies with the U.S., (Washington: 1851), cited in Jacob Spelt, op. cit., p. 81.

*Located in Eastern Ontario.

TABLE 7.4

Value of Exports and Imports and the Amount of Duties
Collected at Selected Ports in Canada for the Years 1850 and 1851
(Figures in Dollars)¹

	1850		Gross Amount of Duties Collected		1851		Gross Amount of Duties Collected	
	Exports	Imports			Exports	Imports		
Total of Canadian Ports	14,952,140	21,227,585	3,078,470		16,205,900	26,793,485	3,687,195	
Amherstburg	35,285	29,465	4,225		99,350	34,355	4,615	
*Belleville	252,420	119,550	18,275		184,225	139,115	20,675	
*Brockville	90,495	289,920	38,480		88,305	299,640	35,075	
*Cornwall	5,335	20,345	2,810		12,790	29,030	3,835	
*Ottawa	-	6,830	1,170		-	-	-	
*Gananoque	6,160	9,195	1,050		7,900	8,205	1,100	
Hamilton	441,110	1,978,910	296,990		456,560	2,532,435	369,460	
*Kingston	437,810	623,800	76,620		165,230	757,655	86,245	
*Picton	17,510	39,575	5,065		21,105	57,320	7,820	
*Prescott	29,250	72,115	6,815		41,155	153,060	14,340	
Quebec City	6,487,615	2,470,695	419,045		7,968,310	3,211,580	464,195	
Montreal	2,180,965	8,631,750	1,292,370		2,649,035	11,005,130	1,576,515	
Toronto	337,785	3,173,610	451,835		409,250	3,392,460	471,650	

Source: Canada, Tables of the Trade and Navigation of the Province of Canada for the Year 1851, (Quebec: Printer to the Queen's Most Excellent Majesty, 1852), pp. 492-493.

¹Figures converted into dollar values from pound sterling values at the exchange rate of £1=\$5 (approximate).

*Ports in Eastern Ontario

Kingston's 7,900. After gaining some population in 1841 when it became capital of the Canadas, it lost 1,700 people in 1844 when the capital was transferred to alternate sites of Toronto and Montreal. The reduction in port functions as a point of transshipment with the opening of the Erie Canal in 1826 and a series of canals on the St. Lawrence in 1848, was another factor in the process of the decline of Kingston. Kingston's initially favoured situation was an outcome of the natural geography of the St. Lawrence-Great Lakes system. As this was overcome, Kingston increasingly lost its economic rationale.¹ Another factor responsible for the retardation of Kingston's growth was its meagre hinterland. For a time, after the opening of the Rideau Canal, Kingston's hinterland was considered its great strength. It was not, however, a sizeable area and its expansion was limited by the character of the Pre-Cambrian Shield.

Up to 1850, Ottawa was the second largest urban centre in the urban hierarchy of the Region. It grew rapidly, mainly because of the rising demand, first for square timber and then for sawn lumber. As a result, Ottawa attracted many entrepreneurs, lumbermen and traders. It was also chosen as the administrative centre for the district of Dalhousie.

Other towns in existence before 1851 were Cornwall, Brockville, Belleville, Glengarry and Stormont. With the exception of Cornwall, the whole Eastern district concentrated on agriculture. Brockville and Belleville developed because of their port functions (Tables 7.3 and 7.4). Other small centres, such as Almonte and Carleton Place, grew up as a result of the establishment of woollen and cotton mills, while Hawkesbury and Pembroke developed mainly as timber towns.

¹Marvin McNinnis, Kingston in the Canadian Economy of the Late Nineteenth Century, Discussion Paper No. 132, (Kingston: Queen's University, no date given), p. 5.

In brief, centres in Eastern Ontario during the first half of the nineteenth century arose and developed either as lumber towns or as administrative and port centres. The prosperity and the growth of these centres depended largely on the economic development of the Region and not vice versa. The Region was propulsive and the urban centres merely acted as reactors to the regional growth. When these functions diminished, so did the growth of these centres.

VII.7 Summary of Period I

Growth of Eastern Ontario's economy before 1851, though initiated by the government defence activities, was basically dependent on the exploitation of white pine resources which was made possible by external demand, internal technology and natural waterways. Even at the end of 1851, the Region's economy was agrarian in nature, where 56 per cent of the labour force was engaged in agriculture, 20 per cent in industry, 14 per cent in services, and the remaining 10 per cent in unclassified occupations. In the Ottawa Valley, about 50 per cent of the total labour force was engaged in square timbering, a part of which combined farming with lumbering. It is, thus, hard to know as to how many of the labour force specialized in lumbering. Farming, which started earlier than square timbering, did not play a dominant role in the Region's early development. Manufacturing - basically a service industry in this period - depended on forestry and farming for its growth.

PERIOD IIDevelopment of Eastern Ontario
1851-1901Introduction

The story of the economic development of Eastern Ontario in the second half of the nineteenth century is not as simple and straightforward as it was in the first half. In the latter half of the century, a number of political, economic, and technological changes occurred that transformed not only the path of development of the forestry industries but also reshaped the pattern of economic development of the Region. This part of the thesis will analyze the effects of these changes on the various sectors of the economy of Eastern Ontario.

CHAPTER VIII

Transportation 1851-1901

The completion of canals on the St. Lawrence, the Ottawa, and the Rideau Waterway provided a partial solution to the problem of transportation in Eastern Ontario, but rivers and canals were available to traffic for only 7 to 8 months of the year. Roads proved of limited use in the absence of powered vehicles. The technology of road construction was still primitive and few areas in the Region were connected by roads. Hence, a need was felt for some means of transportation to allow exploitation of the lumber resources of the interior of Eastern Ontario. Railways could overcome the limitations of both water and road transport.

VIII.1 Railways

In Canada, railways developed later than in the United States. Two reasons often given for this are: (1) Canada spent too much money on canal building and not enough domestic funds remained for railways,¹ and (2) canal building was a slow process. In the case of Eastern Ontario, there seems a third reason for the delay in railway construction,² canals in the Region provided an adequate means of transportation. Railways in Canada, however, became a "necessity after the expansion of the American railroads just as the opening of the Erie Canal before had forced the improvement of the St. Lawrence River."³

¹ Though the canals were built largely with foreign capital, the United Canadas with limited revenues could not bear the burden of debt services without further massive borrowings.

² It is not clear whether an earlier construction of railroads would have provided a viable alternative to canals.

³ Jacob Spelt, op. cit., p. 109.

Though the first railway line¹ was constructed on the Richelieu River in 1836 to facilitate trade and travel between Montreal and New York, railways with locomotives did not arrive in Canada West until 1853,² when the Hamilton-Niagara line was opened by the Great Western Railway. In Eastern Ontario, the first railway line (the Bytown and Prescott) was opened in 1854, linking Ottawa with the St. Lawrence at Prescott. Another line (the Brockville and Ottawa) was added in 1859; it initially ran between Brockville and Arnprior, but was later extended to Pembroke with a branch from Perth to Smiths Falls and a connection to Ottawa. Both these lines, built initially to tap the forest resources of the Ottawa Valley, were ultimately designed to feed the main line of the Grand Trunk Railway³ and the St. Lawrence water route and to establish a link between the Ottawa Valley and American railroads. The Bytown and Prescott Railway connected with the Ogdensburg Railroad and the Brockville and Ottawa with the New York ~~Central~~ Railroad. In 1879, Belleville was linked by rail to Peterborough, the lumber capital of the Trent system. It was also linked with Madoc, a mining area.

Kingston, the major port of Ontario, was the only major urban centre that had no inland rail link even by 1880. One of the reasons for this was that the Rideau Canal provided good communication with Kingston's hinterland,

¹It was a "portage" railway, sixteen miles long. It was designed to overcome a barrier imposed by the rapids on the river. It was thus intended to supplement water transportation.

²It may be noted that a railway line was built around Niagara Falls in 1839, but the gradients proved to be too steep for the steam locomotives of the day and the carriages had to be drawn by horses.

³The Grand Trunk line between Montreal and Toronto was completed in 1856. It passed through four urban centres in Eastern Ontario, Prescott, Brockville, Kingston, Cornwall, Belleville and Trenton.

limited though it was. Another reason was that Kingston faced strong competition from other ports in Eastern Ontario, viz., Prescott and Brockville, which were already tapping the lumber resources of the Ottawa Valley.¹

In general, before 1880, the railroad network in the Region was not as widespread as in Central and Western Ontario. By then most of the major urban centres in Central and Western Ontario were connected with Toronto. In Eastern Ontario, there were only two feeder lines mentioned above, and the Grand Trunk line passing through the major urban centres along the St. Lawrence. Most of the inland urban centres were without railway links. In addition, the limited railway construction in Eastern Ontario was due to competition among various municipalities to attract railway lines to them.² Toronto, being a great commercial and industrial centre, could raise more money for railway lines than other centres. Kingston and other urban centres in Eastern Ontario could not compete with Toronto, because of their small population and relatively low level of industrialization.

Eastern Ontario, however, saw considerable railway construction after 1880. The Region was traversed by the Canadian Pacific in 1885 and railway connections were established from Kingston, Napanee, Belleville, and Trenton to the Northern parts of the Region. Kingston was linked with Pembroke in 1884 by a railway line designed to exploit the forest resources, in competition with the lines from Brockville and Prescott. In 1896, the Ottawa-Arnprior-Parry Sound Railway was opened linking the Ottawa River to Georgian Bay.

¹Jacob Spelt, op. cit., p. 115.

²For example, to aid the Brockville and Ottawa Railway, Lanark and Renfrew advanced \$800,000, Brockville \$415,000 and the Township of Elizabeth town \$150,000. See O.D. Skelton, The Railway Builders (Toronto: Glasgow, Brook and Company, 1916), p. 89. See also T. Naylor, History of Canadian Business 1867-1914, Vol. 1 (Toronto: James Lorimer and Company, 1975).

The railways not only made good the deficiencies of roads and waterways, but also changed the structure of the economy and accelerated the process of urbanization. Suddenly, overland traffic became possible and steam power, iron and steel became important.

The impact of railroads in Eastern Ontario was felt first in the exploitation of the forest resources of the Ottawa Valley. The opening of the Bytown-Prescott and the Ottawa-Brockville feeder lines made possible the movement of lumber from the Ottawa Valley to markets in the United States within a few days instead of a few weeks, as had been the case before. For example, the time taken by the lumber barges from Bytown to Lake Champlain was about ten days but lumber moved by railroads would reach points in Massachusetts in four days, after allowance for transshipment at Prescott.¹ It was hoped that rail freights of \$1.50 per thousand feet would enable railroads to meet competition from water routes. This hope did not materialize, however, because of the problem of transshipment at Prescott and the distant location of the railway station at Bytown from the sawmills, which necessitated additional handling of lumber from mills to railway. The dominant role of water transport did not, however, disappear with the advent of railroads in the Ottawa Valley.

The railway enlarged the profitable area of cultivation (See Tables 4.2 and 10.1) by opening growing urban markets for local agricultural produce. The farmers were now fully involved in the money economy. Officer and Smith go so far as to say that it was "the railway and not the Reciprocity Treaty,

¹Walter Shanley, Report on the Location, Survey and Estimate of the Bytown and Prescott Railway (Bytown: 1851), p. 23. Cited in A.R.M. Lower, The North American Assault . . ., op. cit., p. 111.

that opened the American markets in the early 1850's."¹

The advent of railroads led to concentration and centralization of manufacturing in large urban centres where agglomeration economies were available. Manufacturing plants that had been located in small centres because of available water power either stagnated or even disappeared² or moved to agglomerative centres, notably Toronto, which had attained a dominant position as an industrial, commercial and financial centre as early as the 1850's.

Railroads led to the establishment of locomotive and rolling stock works. In Kingston, they employed 173 workers in 1871 and 301 in 1891 with a wage bill of \$129,000. Locomotive shops in Belleville employed 200 workers in 1880.³

Railways quickened the process of urbanization which had already begun. Between 1851 and 1891 (the period during which the Region witnessed construction of most of the railroads) the percentage of people living in urban areas increased from 12 to 33. Several small towns came into existence along the railway lines and those already in existence developed into large towns. Smiths Falls was a case in point. It became a railway junction with the building of the Brockville-Ottawa line, a line from Smiths Falls to Toronto, and a railway line from Ottawa to Kingston via Smiths Falls.

¹Lawrence Officer and Lawrence Smith, "The Canadian-American Reciprocity Treaty of 1855 to 1866," Journal of Economic History, XXVIII (December 1968), pp. 598-623.

²See Chapter V for evidence on the point.

³See profiles of Kingston and Brockville in the Appendix.

With the coming of railways, however, Eastern Ontario lost the comparative advantages the two natural waterways had conferred on it over the other regions of Southern Ontario. Finally, the Region, except Kingston, suffered a set-back because transport costs of coal from mines in the U.S.A. were lower for Toronto than for Eastern Ontario which involved transshipment.

VIII.2 Roads

The first half of the nineteenth century was an era of natural waterways and canals in Eastern Ontario, the second half of the century was the age of railroads. Travel by road slowed or declined as railroads expanded.¹ In places where there were no railways, waterways were preferred to roads and the fate of those without railways or waterways was sealed until the arrival of the motor car in the twentieth century.

VIII.3 Water Transportation

In spite of their usefulness, railroads in Eastern Ontario could not replace water transportation provided by the Ottawa River, the St. Lawrence River, and the Rideau Canal.

Along with railways, waterways during the second half of the nineteenth century continued to occupy an important position in the transportation systems of the Region. The vessels and freight tonnage on the Ottawa and Rideau

¹Jacob Spelt, op. cit., p. 116.

Canals doubled between 1861-1867.¹ With the construction of the St. Lawrence Canals in 1848, traffic on the St. Lawrence Waterway increased from 428,103 tons in 1850 to 733,596 tons in 1860. This increase, though large in absolute terms, was less than one-third of that on the Erie Canal and far less than the seven-fold increase expected by the canal's promoters.² Furthermore, though the building of canals on the St. Lawrence and the Ottawa Rivers in the first half of the century had made upstream traffic possible, traffic was still constrained by the depth of the canals, i.e., nine feet, and by size of the locks. To overcome these problems, the St. Lawrence Canals were deepened to fourteen feet and the locks enlarged; a process not completed until 1903.³ The deepening and enlargement of the St. Lawrence Canals, however, reduced Kingston's importance as a point of transshipment because some of the lake vessels could now go straight through the St. Lawrence to the Great Lakes.

VIII.4 Summary

Steam power and railroads and the improvement of the water transportation system in the second half of the nineteenth century changed the structure of the economy, helped speed up the exploitation of forest resources, opened American markets, commercialized farming and stimulated urban growth. The constraints imposed by limited local markets were released with the arrival of railways, overland freighting and travel, and winter transport and travel became possible. Some of these changes, however, affected adversely the fate of some of the small centres of the Region.

¹ R.F. Legget, Canals of Canada (Vancouver: Douglas, David and Charles, Newton Abbot: David and Charles, 1976), pp. 231-241.

² Samuel McKeec, Jr., "Canada's Bid for Traffic of the Middle West," Canadian Historical Report, 1940; p. 28, quoted in William R. Willoughby, The St. Lawrence Seaway, A Study in Politics and Diplomacy (Madison: The University of Wisconsin, 1961) p. 40.

³ G.P. deT. Glazebrook, A History of Transportation in Canada, Vol. II, Carleton Library, No. 12 (Toronto: McClelland and Stewart Ltd., 1964), p. 223.

CHAPTER IX

Forestry 1851-1901

In the second half of the nineteenth century, the square-timber trade first dwindled and then disappeared, while the sawn-lumber trade grew in importance. Another forest industry, i.e., the pulp and paper industry, made its appearance in the Region in the last quarter of the century. Because this industry did not exert any significant influence on the development of Eastern Ontario during this period, it will not be discussed until the next period.

IX.1 Forest Operations

Though sawmilling in Eastern Ontario had its beginning in the late 1830's to meet the rising American demand, nearly everyone interested in forest exploitation was still engaged in the production of square timber for the British market as late as the 1860's. Eastern Ontario, especially the Ottawa Valley, was still rich in white pine. Table 9.1 indicates that the largest output of pine, 98 per cent of which was of white pine, was recorded in the year 1881, after which it began to decline.¹ In 1901, the output of pine had fallen to such a low level (35,091 cubic feet) that it constituted only 0.42 per cent of the level of output reached in 1881. Eastern Ontario's share of the total pine output of Ontario fell from 60 per cent in 1881 to 4 per cent in 1901. This reflects two fundamental changes:

- (1) the pine resources of Eastern Ontario had been almost exhausted, so that
- (2) by 1901 the frontier of forest operations had moved beyond Eastern Ontario.

¹Corresponding figures are not available for the 1851 and 1861 Censuses.

Table 9.1

Production of Square Pine,* Eastern Ontario, by County or District for Selected Years

	(in cubic feet)			
	1871	1881	1891	1901
Addington	434,701	2,297,924	468,486	2,720
Brockville	-	400	47,710	-
Carleton	24,270	22,486	2,725	240
Cornwall	-	-	-	-
Dundas	17,532	7,316	7,045	1,504
Frontenac	6,500	1,692	2,111	2,000
Glengarry	14,973	19,917	40,476	3,633
Leeds and Grenville	3,107	22,135	-	50
Hastings	619,515	668,507	267,697	8,897
Lanark	711,604	8,580	45,918	2,210
Lennox	2,968	2,409	17,014	2,617
Ottawa City	-	-	-	-
Prescott	39,685	107,212	6,552	951
Prince Edward	2,268	104,975	4,475	951
Renfrew	3,491,699	4,888,442	137,566	7,226
Russell	14,879	307,118	9,488	702
Stormont	12,132	52,464	39,015	1,390
Total Eastern Ontario	5,395,833	8,511,577	1,096,278	35,091
Total Ontario	16,315,901	14,111,497	7,480,683	1,044,439
Eastern Ontario as a percent- age of Total Ontario	33%	60.32%	14.65%	3.35%

* Includes Red and White Pine; about 98% of square pine consisted of white pine

Source: Census of Canada, Various Decennial Years.

Evidence of the shift of timber operations to the West is provided by Table 9.2, which shows the area under timber license, by district, for various years. In the Western district, the area under timber license rose from 2,015 square miles in 1868 to 10,950 square miles in 1901, an increase of 443 per cent; in the Central district, the area declined from 1,889 square miles in 1868 to 949 square miles in 1901. The Ottawa district too suffered a decline in area under timber license, but not as much as the Central district. Its area under timber license decreased only by 18 per cent between 1868 and 1901,¹ while its share in total area under timber license in the province fell to 35 per cent from 66 per cent during the same period.²

IX.2 The Square-Timber Trade

The square-timber trade in the early years of the second half of the nineteenth century witnessed the completion of the gradual process of Britain's reduction of protection on imports of timber from her colonies. This process began in the early 1820's and was completed in 1860.³ The disappearance of imperial protection appears to have had no significant effect on the exports of timber at first. In the short period, there was a small decline in imports of colonial timber. In the long run, the end of the preferential duties on colonial timber did have a decisive effect on Canadian timber exports. Square timber, for so long the principal article of foreign trade, began to lose

¹Calculated from Table 9.2.

²The evidence of decline in the Ottawa district is also provided by woods and forests revenue figures. In 1884, the Western and Ottawa district were at par, each contributing 42 per cent of the total woods and forests revenue. But by 1889, the Ottawa share had slipped to 34 per cent and the Western portion had risen to 50 per cent. Cited in H.V. Nelles, The Politics of Development (Toronto: Macmillan of Canada, 1974), p. 65.

³The first reduction in protection occurred in 1821. The second reduction took place in 1842, after which there were a quick series of protection reductions. See A.R.M. Lower, The North American Assault, op. cit., p. 104.

Table 9.2

Area Under Timber Licenses in Ontario, by
District for the Years Indicated

<u>Year</u>	<u>Ottawa</u>	<u>District</u>		<u>Total</u>
		<u>Central</u>	<u>Western</u>	
		(square miles)		
1868	7678	1889	2015	11582
1870	7633	1849	2523	12005
1875	7406	2022	7621	17049
1880	7228	1456	7256	15940
1885	6503	1537	9174	17214
1890	4777	1500	7278	13555
1895	6589	1509	9753	17851
1900	6154	975	9603	16732
1901	6292	949	10950	18191

Source: J.E. Defebaugh, History of the Lumber Industry in America,
(Chicago: The American Lumberman, 1906), pp. 172-189

* These districts roughly approximate the area covered presently, in respective order, by Eastern, Central and Western regions of Southern Ontario. However, Ottawa District may have included some parts of the Valley in Lower Canada. Similarly, Central District may have included the Kingston area, and part of the Western District might have included modern Northwestern Ontario.

its importance by 1863¹ in the United Canadas, but in Eastern Ontario the decline, however, came later, after 1881, because of the large supply of pine in the Region. The decline in the square-timber trade in the Region was, thus, due to three factors, viz., the end of imperial preferences, the exhaustion of the white pine forests, and with the expansion of the American market, the shift in demand from square timber to sawn lumber. Exports of square timber and deals to Great Britain diminished. No statistics of exports of square timber from Eastern Ontario are available, but estimates can be made from the recorded exports of white pine, red pine and deals from Quebec, because more than 99 per cent of the pine and deal shipments from the port of Quebec went to Great Britain and about 90 per cent of these shipments came from the Ottawa Valley.² The exports of forest products from the various ports in the United Canadas for the years 1851 and 1862 are shown in Tables 9.3 and 9.4, respectively.

White pine shipped from the port of Quebec in 1851 was 410,413 tons; in 1862, the figure had declined to 387,327 tons. Exports of white pine square timber as a percentage of total value of exports of forest products fell from 27.57 in 1851 to 22.25 in 1861, and the corresponding percentages for red pine timber and deals were respectively 7.73, 16.21 in 1851 and 4.76, 15.29 in 1861.³ Combining the square-timber trade with the trade in deals under one category gives the proportion of timber exports to total forest exports as 51.56 in 1851 and 42.31 in 1862.

¹ A.R.M. Lower, "The Trade in Square Timber," op. cit., p. 47.

² S.J. Gillis, op. cit., p. 106, and Tables 2.1 and 9.3.

³ It must be noticed that the decline in exports of deals was not significant because the quality of deals was high and the market less sensitive to policy changes.

Comparable statistics on exports of forest products from various ports in Canada are not available for the succeeding censuses. However, a comparison of total exports of forest products from the province of Quebec for the two years 1851 and 1881 indicates that exports of square timber had fallen significantly in the second half of the nineteenth century. For example, exports of white pine timber from all ports in Quebec totalled 453,435 tons in 1851; by 1881, they were reduced to 327,160 tons,¹ and their share in total forest exports had declined to 1.3 per cent.

Another development, i.e., the rise of the sawn-lumber trade with America, is also clearly shown by Tables 9.3 and 9.4. Exports of sawn lumber as a proportion of total forest exports increased from 14.17 per cent in 1851 to 24.63 per cent in 1862. The increase was remarkable for ports in Eastern Ontario, especially for Belleville.

IX.3 The Sawn-Lumber Trade with America

The decline of the square-timber trade in the second half of the nineteenth century was accompanied by a rise in the sawn-lumber trade with America, though for some time both these trades continued simultaneously. There were three main reasons for the rise of the sawn-lumber trade with the U.S.A.: (1) exhaustion in the U.S.A. of wood supplies in relation to demand; (2) the development in conjunction with the natural waterways, of the canal and railroad systems; and (3) the expansion of American demand.

Vermont, which had been the major source of lumber supply for the U.S.A., was "lumbered out" by the early 1850's, while the demand for lumber

¹Canada, Tables of the Trade and Navigation of the Dominion of Canada, 1881 (Ottawa: Maclean, Rogers & Co., 1881), pp. 561-584.

**Table 9.3 Exports of Forest Products from Ports of the Canadas
for the Year Ending January 1852**

Name of the Product & Port	Exports		Exported to
	Quantity Short (in tons)	Value (£)	
(1) <u>White Pine (timber, square)</u>			
Quebec	410,113	379,655	About 99.7% of the exports from Quebec were to Great Britain and 100% of the exports from St. John's were to the U.S.A.
St. John's	40,001	24,724	
Other	3,311	2,592	
Total	453,425	406,971	
(2) <u>Red Pine (timber, square)</u>			
Quebec	90,488	114,058	99% of the exports of Red Pine went to Great Britain
Other	657	717	
Total	91,145	114,875	
(3) <u>Deals (pieces)</u>			
Quebec	3,526,047	239,343	About 99.9% of the exports went to Great Britain.
(4) <u>Sawn lumber (planks and boards) (sup. feet)*</u>	129,905,596	209,138	99% of the sawn-lumber exports were destined for the United States.
Bath	625,600	1,027	
Belleville	14,573,335	29,101	
Napance	4,202,962	8,503	
Pictou	357,900	595	
Prescott	404,325	298	
Quebec	2,338,000	3,800	
Toronto	3,470,200	6,450	
Kingston	7,739,684	13,021	
St. John's (Quebec)	19,502,662	31,164	
Other Ports	66,690,928	115,179	
(5) <u>Other Forest Products</u> (elm, ash, ashes, pearl, ashes-pots, oak, shingles, etc.)			99% of exports went to Great Britain
Quebec	---	228,894	
Montreal		165,330	
Other Ports		111,838	
Total		506,602	
(6) <u>Total Forestry Exports</u>	---	1,476,929	
White Pine Exports as a Percentage of Total Forestry Exports		27.57	
Red Pine Exports as a Percentage of Total Forest Exports	---	7.73	
Deals Exports as Percentage of Total Forestry Exports		16.21	
White Pine, Red Pine and Deal Exports as Percentage of Total Forestry Exports		51.56	
Sawn lumber Exports as a Percentage of Total Forestry Exports		14.7	
White Pine, Red Pine, Deals and Other Forestry Product Exports as a percentage of Total Forestry (excluding sawn lumber) Products		85.13	

Source: Canada, Tables of the Trade and Navigation of the Province of Canada
for the Year 1851, (Quebec: Printer to the Queen's Most Excellent
Majesty, 1852), pp. 320-363.

Table 9.4

Exports of Forestry Products From Ports
of the Canada for the Year 1861

Name of the Port and Forestry Products	Exports		Exported to
	Quantity (ton)	Value (\$)	
(1) <u>White Pine</u> (timber, square)			
Belleville	295	1,860	Exports from all ports except Quebec, went to the United States.
Kingston	560	1,300	
Quebec	387,327	1,957,620	
Other Ports	42,075	149,266	
Total	430,257	2,110,046	
(2) <u>Red Pine</u> (timber, square)			
Quebec	62,278	441,087	Same as above.
Trenton	675	3,000	
Other Ports	2,710	8,026	
Total	65,663	452,113	
(3) <u>Deals & Deal Ends</u> (Standard Hundred)			
Quebec	38,231	1,275,419	Trenton exported deals to the USA while Quebec and other ports exported to Great Britain.
Trenton	635	25,346	
Other Ports	13,780	149,576	
Total	55,646	1,450,341	
(4) <u>Sawn lumber</u> (planks & boards)	(M. feet)		
Belleville	16,022	160,220	Except for those shipped from Quebec and Montreal all planks and boards were exported to the United States.
Brockville	6,223	60,838	
Bytown	27,046	270,974	
Kingston	8,313	80,668	
Napance	10,079	99,762	
Quebec	1,250	24,865	
Montreal	3,114	32,677	
Toronto	14,050	138,784	
Trenton	14,704	151,366	
Other Ports	100,801	1,315,572	
Total	246,203	2,335,726	
(5) <u>Other Forestry Products</u> (pearl ashes, birch, maple, oak, shingles, walnut, staves, etc.)			
Montreal		931,895	70% of exports of shingles went to the USA. Exports of pearl ashes, and oak, went to Great Britain.
Quebec		543,129	
Napance		38,227	
Prescott		4,995	
Kingston		3,571	
Trenton		5,180	
Other Ports		1,607,674	
Total		3,134,671	
(6) <u>Total Exports of Forest Products</u>		9,482,897	
White Pine Exports as a percentage of total forestry exports		22.25	
Red Pine Exports as a percentage of total forestry exports		4.76	
Deals Exports as a percentage of total forestry exports		15.29	
White pine, red pine and deals exports as a percentage of total forestry exports		42.31	
Sawn lumber exports as a percentage of total forestry exports		24.63	

Source: Canada, Tables of the Trade and Navigation of the Province of Canada
For the Year 1862, (Quebec: Hunter and Co., 1863), pp. 164-174.

had been rising with the expansion of new cities, notably Chicago and Milwaukee. Thus, to meet this rising demand in relation to the supply of lumber products, the U.S.A. looked to the Canadas for an alternative source of lumber.

The opening of Canadian canals and railroads in the early fifties, following the opening of their counterparts in America, provided routes by which large supplies of lumber went to American market. Centres located on canals in the Region turned their attention from producing square timber for the British market to producing sawn lumber for the American market. Perth on the Rideau Canal was a case in point.¹

Another factor that accentuated expansion of trade was the Reciprocity Treaty which was signed in 1854 between the U.S.A. and Great Britain for the British North American Provinces (as they were called at that time).² It

¹ A.R.M. Lower, The North American Assault ..., op. cit., p. 99.

² There is no general agreement as to the effects of the Reciprocity Treaty of 1854. In the Canadian economic literature, there seem to be three different views about its results. D.C. Masters in The Reciprocity Treaty (Toronto: McClelland and Stewart, 1963), pp. 106-107, concludes that the rapid growth of commerce between America and the British North American colonies would have taken place even without the Treaty, but that the Treaty, nevertheless, gave an impetus to that trade. W.T. Easterbrook and H.G.J. Aitken in Canadian Economic History, op. cit., p. 248, relate the growing maritime trade in the 1850's to the Treaty but do not examine the effects of the Treaty on the province of Canada. Lawrence Officer and Lawrence Smith in "The Canadian-American Reciprocity Treaty of 1855 to 1866," Journal of Economic History, Vol. XXVIII (December 1968), pp. 598-623, and Robert E. Ankli in "The Reciprocity Treaty of 1854," The Canadian Journal of Economics, Vol. IX, No. 1 (February 1971), pp. 1-20, have used the Treaty as a test case for the theory of customs unions. They discuss the welfare (normative) effects of the Treaty, making a distinction between "trade diversion" and "trade creation" effects. Officer and Smith conclude that the Treaty had small welfare effects, whereas Ankli concludes that the Canadian objective of increasing exports while limiting imports was no doubt achieved, but achieved largely independently of the Treaty. For more on the welfare application of the customs theory, see R.G. Lipsey, "The Theory of Customs Unions: A General Survey," Economic Journal, Vol. 70 (September 1960), pp. 465-513, and M.B. Krauss, "Recent Developments in Custom Union Theory: An Interpretive Survey," Journal of Economic Literature, Vol. X, No. 2 (June 1972), pp. 413-436.

provided for the free entry of natural products and raw materials into the territory of each party.

During the Treaty period, the already growing lumber exports from the Ottawa Valley to the U.S. went up. The Valley's exports were normally through the Richelieu Canal and thence to New York; but some of the exports went via the Rideau Canal to Oswego on Lake Ontario and thence to New York via the Erie. It is estimated that about 400 million square feet of Canadian lumber went through Oswego in the last two years of the Treaty.¹ Whatever the effects of the Treaty may have been, the exports of planks and boards to the U.S.A. increased phenomenally from \$76,207 in June 1853 to \$1,210,369 in June 1867, one year after the abrogation of the Treaty.^{2,3}

During its short life, the Treaty benefitted the lumbermen of the Region by providing them with higher incomes for their products, and thus raised the level of income of the Region too. (Presumably, some of the money earned in wages and profits was spent on land clearing and home building.)

¹T.P. Patterson, Secretary of State to the Montreal Board of Trade, Statement Relating to Trade, Navigation and Mining for the Year 1872 (Montreal: no publisher given, 1873), p. 78, cited in A.R.M. Lower, The North American Assault ..., op. cit., p. 140.

²Calculated from Tables of the Trade and Navigation of the Province of Canada for the Year 1853 (Quebec: Printer to the Queen's Excellent Majesty, 1854) and from Sessional Papers, 1867, Vol. 1, No. 1, p. 155. This reasoning, however, assumes "other things being equal", which was never the case, especially in 1861 when the Civil War started.

³Also see William L. Marr and D.G. Paterson, Canada: An Economic History (Toronto: The Macmillan Company of Canada, 1980), for a discussion on the Reciprocity Treaty of 1854-1866, pp. 138-153.

Exports of sawn lumber from the St. Lawrence Lowlands subregion of Eastern Ontario passed through the ports of Belleville, Napanee, Picton and Brockville. At mid-century, Belleville was the largest single port in Eastern Ontario through which sawn lumber exports passed. In 1851, planks and boards worth £29,100 (14 per cent of all Canadian lumber exports) were shipped from the port of Belleville to the United States (calculated from Table 9.3). However, by 1861, the percentage had fallen to 7 (calculated from Table 9.4). The total sawn-lumber exports from Eastern Ontario ports went up from £52,545 (or \$262,725) in 1851 to \$823,828, an increase of 200 per cent.

IX.4 Impact of the Sawn-Lumber Trade on Eastern Ontario

Many American firms in Eastern Ontario, which had begun to build larger mills in order to increase their outputs in the early 1840's, continued to expand mill capacity. The flow of American capital to Canada, which had started in the late 1830's, continued during the reciprocity period. Firms owned by Bronson and Harris were cutting about 30 million feet a year around 1867.¹

The first impact of the opening of the American market for Eastern Ontario was an inward movement of American capital. Most of this American capital was invested in the sawmills located in the Bytown-Hull area. At the middle of the century, the total investment in sawmills on the Ottawa River system was estimated to be about £180,000.² It is not clear how

¹A.R.M. Lower, The North American Assault ... op. cit., p. 140.

² S.J. Gillis, op. cit., p. 108.

much of this investment had been made by Americans. Another effect of the rapidly rising sawn-lumber trade to the U.S.A. was the construction of railway lines to tap the lumber resources of the Ottawa Valley. Americans linked the Ottawa area with major commercial centres of the U.S.A. by two railway lines described earlier.¹

The growth of sawmills had multiplier and spread effects. Industries auxiliary to the lumber trade grew up, creating backward and forward linkages in the form of the manufacture of axes, saws and other products used in sawn lumber production and others that used wood as their materials such as shingles and doors. According to the 1851 Census, there were five axe factories and 38 axe makers in Upper Canada. The 1861 Census reported 15 axe and edge-tool factories, 11 of which reported a total annual production of \$95,000. In Eastern Ontario, one such firm in Kingston produced output valued at \$42,000 that comprised 44 per cent of the total for Upper Canada. A foundry company was set up in Ottawa in 1859 to manufacture broad and narrow axes.² In all there were 90 foundries in Upper Canada in 1851, of which 15 were located in Eastern Ontario, employing 130 workers. In 1891, the number of foundries in the Region had increased to 65 and the level of employment to 1000 workers (See Table 11.4 in Chapter XI).

A large proportion of the skilled labour required came from the U.S.A.³ Thus, the wage income effects of these immigrants were limited to the extent

¹It is disputable whether railways in the Ottawa Valley were built to tap the lumber resources of the area or open a market for lumber resources. One thing is clear, i.e., their arrival did stimulate the timber trade with the U.S.A.

²A.R.M. Lower, The North American Assault ..., op. cit., p. 143.

³Ibid., p. 143.

that the wage income was spent in the Region, and savings were not transferred to the U.S.

Other secondary forest-related industries that sprang up during the reciprocity period were: planing mills, pail factories, cabinetware factories, blind factories, chair factories, match factories, etc. The Census of 1851-52 reported 19 planing mills in Upper Canada, of which two were located in Kingston, one in Addington County, one in Prince Edward County, ten sash and blind factories, of which two were located in Hastings County, six chair factories, one located in Glengarry County and one in the County of Addington. By 1860 the number of forestry-related manufacturing establishments had risen remarkably. In 1860-1861, there were 23 sash, door and blind factories, and planing mills - two of them were located in Kingston, three in Ottawa, one in Addington County, one in Hastings County, one in Renfrew County, and one in Stormont County; 41 shingle mills - 12 of them were located in Eastern Ontario, producing an annual output of \$42,560 (i.e., 54 per cent of the total Canada West output of shingle mills); 131 cabinetware factories of which nine were located in Eastern Ontario counties, producing an annual output of \$12,300; and 11 match factories. All these industries received either backward or forward linkage effects of forest operations.

In brief, the exploitation of forest resources provided an important impetus to the growth and the prosperity of the Ottawa Valley. Sawmills with a production capacity of more than 20 million cubic feet per year were common. The construction of railroads expedited the delivery of sawn lumber to the American market. The wasteful process of squaring timber came to an end.

IX.5 The Lumber Industry (1870-1901): Sawmilling

Growth of forest industries in the Region in the second half of the nineteenth century continued mainly because of intensifying American demand for Canadian lumber, improved means of transportation, canals, and railroads, and the immigration of American enterprise and capital. In the last three decades of the century, new influences came into play, notably the effects of the abrogation of the Reciprocity Treaty, the Confederation of the country with the consequent changes in trade policy, the emergence of concern for "conservation" of forest resources, the growth of native companies, and changes in technology.¹

Demand for Canadian lumber from expanding American cities continued. Railroad and water transportation during this period, according to Lower, determined the limit of the field of battle for the Canadian forests by American markets, notably those of New York and Chicago.² Confederation brought the exploitation of forest resources under provincial jurisdiction. The new provinces adopted a policy of maximization of revenue from forest resources by imposing new levies.³ Eventually, the indiscriminate cutting of forests and the extension of settlement created a conflict between the

¹For a comprehensive discussion on these old and new factors, see A.R.M. Lower, The North American Assault ..., op. cit., pp. 161-164.

²Ibid., pp. 160-161.

³For example, over 1868-1880, about 25 per cent of Ontario government revenue came from lands, forests and mines. The sale of timber and timber berths accounted for 50 per cent of this 25 per cent. Between 1888-1889, the percentage of total revenue derived from lands, forests and mines rose to 35 and 30 per cent of it came from the sale of timber berths. R.F. Neill, "The Neo-Classical-Neo-Marxian Staple Theory and Resource Export Industries in Ontario," a paper presented at the annual meeting of the Canadian Economics Association, held in London, Ontario, 1978, pp. 7-11.

settler and the lumberman. The settler's attempts to clear and farm poor soil did more harm than good to the economy of Eastern Ontario in two ways:

(1) Yield per acre of field crops, especially of wheat, decreased significantly¹ (See Chapter on Agriculture in this period); and (2) Land was taken up and then abandoned after the timber on it was cut off or after it was discovered that the soil was poor. This resulted in the premature exhaustion of white pine. The lumberman did not like this situation as it reduced the supply of his timber stock. In the last quarter of the century, therefore, concern developed about conservation of the forest resources. It was felt that some sort of controls had to be instituted over the use of land that was good forest land but poor agricultural land.

The sawn-lumber industry in Eastern Ontario grew rapidly and seems to have reached its peak by the end of this period. The gross value of output of sawmills in the Region increased from \$4,803,798 in 1871 to \$9,287,179 in 1891, an increase of 93 per cent (Table 9.5).² Of the two

¹ Midge was another contributing factor for the decline in yield.

² Separate statistics for sawmills are not available from the 1901 Census because they are buried under industrial groups "log products" and "lumber products". Furthermore, statistics of lumber products industries are not even complete in the case of certain census divisions. Thus, it is difficult to say whether the peak of sawn-lumber production in Eastern Ontario was reached in 1891 or 1901.

TABLE 9.5
Sawmill Statistics in Eastern Ontario and Ontario
1871-1901

		<u>1871</u>			
	No. of Estab- lishments	Hands Employed	Yearly Wages \$	Gross Value of Output \$	Value Added \$
Eastern Ont.	412	4,723	558,559	4,803,798	1,809,712
Ontario	1,837	13,825	2,675,390	12,773,741	5,625,507
Eastern Ontario as a % of Ontario	22	34	21	38	32
		<u>1881</u>			
Eastern Ontario	365	6,920	1,360,162	5,527,917	2,205,791
Ontario	1,761	16,846	3,581,225	16,629,075	7,643,278
Eastern Ontario as a % of Ontario	21	41	38	33	29
		<u>1891</u>			
Eastern Ontario	359	9,152	2,395,046	9,287,179	4,100,327
Ontario	1,895	23,851	6,577,006	26,987,259	12,432,718
Eastern Ontario as a % of Ontario	19	38	36	34	33

Source: Calculated from Canada, Department of Agriculture, Census of Canada for various years.

decades, 1871-1881 and 1881-1891, the production of sawn lumber in Eastern Ontario grew rapidly in the latter period. The level of employment rose by 94 per cent from 4,723 in 1871 to 9,152 in 1891. More than one-third of Ontario's sawmill output and employment was accounted for by the Region, though the number of establishments in the Region made up only one-fifth of Ontario's total. The average size of the firm (measured in gross value of output) jumped from \$11,659 in 1871 to \$25,870 in 1891. Sawmills located in Ottawa had the largest average size of all firms not only in Eastern Ontario but also of those located in the Province of Ontario. For example, the average size of sawmills (measured in the gross value of output) in Ottawa was \$559,000 in 1891, compared with \$14,241 for all sawmills in Ontario.¹ The reasons for the relatively large size of sawmills in Ottawa were easy access to sources of power (first abundant water power and then at the close of the century hydro-electric power generated by the falls on the Ottawa River and its tributaries) and the relatively greater capital intensity of mills. The average size of sawmills in Ottawa in 1891, measured by capital intensity, was \$1,149,200, as compared with \$27,176 for Ontario as a whole.² Capital invested in the Ottawa sawmills came, at first, from American entrepreneurs, but later, in the 1860's, some native Canadians like R. Booth of Ottawa began investing in sawmilling as opposed to square timbering.

¹ Calculated from Canada, Department of Agriculture and Lands Statistics, Census of Canada, 1891, Vol. 3 (Ottawa: Printer to the Queen's Excellent Majesty, 1894), pp. 294-295.

² Ibid., pp. 294-295.

Official statistics of the exports of sawn lumber from the ports of Eastern Ontario are not available after 1868. However, following Lower,¹ it can be estimated that during 1870-1901, the gross value of sawn-lumber exports to America from Eastern Ontario varied between \$2 million and \$4.5 million.

IX.6 Summary

The second half of the nineteenth century was the heyday of the sawn-lumber industry of Eastern Ontario. The industry, which until 1835 was confined to small mills meeting local needs, became a giant in the latter half of the century, catering to the needs of foreign, especially American, markets. The industry expanded enormously in terms of output, employment and in the average size of each firm. Technical advances after 1861 significantly reduced the use of direct-drive water power and made it possible to run machines first by steam and later by hydro-electric power.

The period is also characterized by the decline and disappearance of the square-timber trade, as a result of which the pattern of trade of Eastern Ontario changed from dependence on the British market to the American market. Exports of sawn lumber were facilitated by railroads, although the importance of waterways continued unabated. The opening of the Parry Sound-Ottawa railway line in 1896 expanded lumber operations to the West of Ottawa.

¹Lower estimated that in Ontario, the exports of square timber, boards, planks and deals taken together probably constituted 45 to 50 per cent of lumber production between 1875 and 1910. (See A.R.M. Lower, The North American Assault ..., op. cit., p. 145).

CHAPTER X

Agriculture 1851-1901

Agriculture in Eastern Ontario underwent a great many changes in the second half of the nineteenth century. The demand for its products (especially barley and oats) increased significantly during the Reciprocity Treaty of 1854-1866 and the American Civil War of 1861-1865. During this period, Eastern Ontario's agriculture also witnessed the expansion of two industries, namely, dairying and cattle raising, which have been since then a major source of agricultural earnings. This Chapter will analyze the effects of these changes on the development of agriculture and on the Region in general, and compare the growth of agriculture in the Region with that in the other regions of Southern Ontario.

X.1 Agricultural ProductionX.1.1. Field Crops

Two subperiods 1851-1871 and 1871-1901 have been selected to measure the growth of agricultural production in the Region in the second half of the nineteenth century. Production of fall and spring wheat in 1871 was recorded as 1,576,774 bushels, which was down 17 per cent from 1,892,000 bushels in 1851. Acreage under wheat cultivation had decreased by 16 per cent from the 1851 level (Tables 4.2 and 10.1). The decrease in wheat acreage was due to the increasing importance of barley in the Region.¹ Wheat production also recorded a lower yield per cultivated acre in 1871, compared

¹Variations in wheat prices were also responsible for the decline in wheat acreage. See D.A. Lawr, "The Development of Ontario Farming 1870-1919: Patterns of Growth and Change," Ontario History, Vol. 44, pp. 239-251. For a supply model for wheat, see W.L. Marr, "The Wheat Economy in Reverse: Ontario's Wheat Production," Canadian Journal of Economics, Vol. XIV (February 1981), pp. 136-144.

TABLE 10.1

Production and Acreage of Selected Crops,
Southern Ontario Regions, 1871 and 1901

Region	Wheat (Winter & Summer)			Barley			Oats			Peas			Corn			Potatoes		
	Acres	Output	Yield Per Acre	Acres	Output	Yield Per Acre	Acres	Output	Yield Per Acre	Acres	Output	Yield Per Acre	Acres	Output	Yield Per Acre	Acres	Output	Yield Per Acre
Eastern Ontario	160,955	1,576,774	9.80	---	1,521,897	---	---	4,525,267	---	---	1,205,897	---	---	388,312	---	52,829	5,100,673	96.55
Central Ontario	722,322	8,017,220	11.09	---	5,137,198	---	---	9,194,334	---	---	3,681,851	---	---	1,014,266	---	72,856	7,545,069	103.56
Western Ontario	482,100	4,634,267	9.61	---	2,801,168	---	---	8,374,104	---	---	2,762,287	---	---	1,744,534	---	48,199	4,408,753	91.66
Southern Ontario (Total)	1,365,377	14,228,261	10.42	---	9,460,263	---	---	22,093,705	---	---	7,650,035	---	---	3,147,114	---	173,884	17,054,495	98.08
Eastern Ontario	161,581	2,669,221	16.52	76,461	1,655,996	21.65	629,083	16,439,820	26.13	85,615	1,345,825	15.77	42,805	2,053,678	47.97	46,939	5,494,902	117.06
Central Ontario	715,527	14,265,461	19.93	326,177	9,226,283	28.22	1,085,506	36,466,983	33.59	296,494	5,843,487	20.11	63,240	3,990,057	63.09	78,932	8,317,447	105.38
Western Ontario	598,128	11,596,428	19.38	180,363	5,137,709	28.48	955,986	34,250,782	35.82	196,434	3,915,607	19.93	225,450	18,412,886	81.67	44,763	5,572,622	124.50
Southern Ontario (Total)	1,475,236	28,530,310	19.36	538,005	16,019,988	27.48	2,670,575	87,157,585	32.63	572,543	11,104,919	19.39	331,495	26,456,621	73.77	179,634	19,384,971	113.60

--- Data not available

Source: Compiled from the Censuses of Canada for the years 1871 and 1901, using Census district data on field crops.

Notes: Yield per acre is yield per cultivated acre.
Acres are cultivated acres.

to 1851. The lower yield per cultivated acre seems to have resulted from the depletion of fertility of the land in the absence of crop rotation, the extension of farming to marginal lands, and the occurrence of midge.

From 1871 to 1901 (i.e., after the abrogation of the Reciprocity Treaty and Confederation and after the midge had gone) the combined production of fall and spring wheat in Eastern Ontario increased to 2,669,221 bushels in 1901, which was an increase of 69 per cent over the 1871 level (Table 10.1).¹ Production of wheat in the Region shifted dramatically from fall wheat to spring wheat (not shown in the Table above). This was in strong contrast to Central and Western Ontario where fall wheat exceeded the production of spring wheat. Wheat yield per cultivated acre in the Region, although still lower than that in Central and Western Ontario, had increased from 9.80 bushels per acre in 1871 to 16.52 bushels in 1901 (Table 10.1).

Barley output, on the other hand, increased phenomenally from 153,000 bushels in 1851 to 1,521,897 bushels in 1871, up about 9 times in 20 years. Between 1871-1901, however, it rose only by 9 per cent. Prince Edward County alone produced more than 20 per cent of the barley output of the Region. According to American statistics, about 3,612,000 bushels of barley were exported from Ontario to the United States in 1868, a large proportion of which came from the Eastern part of Ontario.² Higher barley production was not due to a higher

¹The fact that wheat production rose significantly during 1871-1901 (when midge was gone) over the 1851-1871 period implies that a large part of wheat output decline in 1851-1871 was due to midge. The increase in wheat output in the 1871-1901 period was due to the combined effects of crop rotation, mechanization of agriculture and the absence of midge.

²W.J. Patterson, Report on The Trade and Commerce of Montreal for 1870 (Montreal: 1871), p. 79, cited in R.L. Jones, op. cit., p. 241.

yield per cultivated acre but rather to the larger acreage of land under barley.¹ Barley was cultivated over a larger acreage owing to (1) the uncertainty associated with wheat production because of midge, and (2) the increasing American demand for barley for breweries.

Barley was also used by domestic breweries located in various parts of the Region. The volume of barley consumed domestically, however, was less than that exported to markets in the United States.² The rising American demand for beer and the Reciprocity Treaty were the two major factors that stimulated the export of barley from the Region to the U.S.A. A significant proportion of the output of barley was exported to Great Britain as well. Figures for exports from Eastern Ontario ports indicate that barley exports increased from 66,795 bushels in 1854 to 1,232,274 bushels in 1866, i.e., an increase of more than 1700 per cent. Among the ports which exported barley to the U.S.A in 1866 were Belleville (362,498 bushels), Kingston (258,047 bushels), Picton (234,957 bushels), and Morrisburg (4,968 bushels).³

Production of oats increased by 61 per cent between 1851-1871 and 262 per cent between 1871-1891 (Tables 4.2 and 10.1). Exports of oats from the United Province of Canada increased from 2,563,325 bushels in

¹ Acreage under barley production is not recorded in the 1871 Census. However, using the 1861 figures for acreage under barley, it becomes clear that barley yield per acre declined from 20.51 bushels in 1851 to 17.92 in 1861. Calculated from Census for the Canadas for two decennial periods 1851-1852 and 1860-1861.

² R.L. Jones, op. cit.; p. 241.

³ Canada, Tables on the Trade and Navigation of the Province of Canada, 1854-1866 (Quebec and Ottawa: 1855, 1866). For discussion on effects of the Reciprocity Treaty on agricultural exports, see, William L. Marr and D.G. Paterson, op. cit., Chapters 4 and 5.

1862-1863 to 9,549,994 bushels in 1863-1864 and decreased to 4,207,211 bushels in 1864-1865. Almost all the Canadian oats exported were grown in Lower Canada or Eastern Upper Canada (presently Eastern Ontario).¹ The production of potatoes increased by 149 per cent over the same period. Corn output decreased to 388,000 bushels in 1871 from 468,000 in 1851, but increased dramatically to 2,053,678 bushels in 1901.

In spite of these increases, the yield per acre of almost every crop in Eastern Ontario was still low, compared with that of the other regions of Ontario. Further, in the 1890's, cheap and fertile land in Western Canada attracted many farmers of the Region. The first railway line from Eastern Canada (the Canadian Pacific) reached Western Canada in 1885, and only after that did wheat from the West arrive in Eastern Canada. When the high-quality wheat of the West began to pour into the European and Eastern Canadian markets at the close of the century (around 1896), Ontario farmers (especially those of Eastern Ontario) were forced to move into more profitable branches of agriculture than wheat growing, i.e., raising stock and dairy farming.

X.1.2 Dairy Farming

Dairy farming in Eastern Ontario up to 1850 was mostly a household industry. Commercial dairy farming was hindered by many factors. There was no local demand for butter, and in the case of cheese, the local demand was met by cheaper imports from America. Probably the biggest hindrance to the expansion of dairy farming was the relatively higher returns from wheat production. However, at the beginning of the second half of the nineteenth century, some parts of Eastern Ontario had started producing cheese commercially.

¹ Montreal Witness (January 21, 1865), cited in R.L. Jones, op. cit., p. 217.

The cheese industry in the lower Ottawa Valley and Prince Edward County was established partly because of the failure of the wheat crop and arrival of Americans who were acquainted with the process of making cheese. The cheese industry in New York was then well established in Jefferson and the St. Lawrence counties, just across the St. Lawrence River.¹

The American Civil War of 1861-1865 gave an impetus to dairy farming in Eastern Ontario. Higher prices for dairy products which prevailed during the Civil War, tempted many farmers in Eastern Ontario to begin dairy farming.

According to the 1871 Census, production of homemade cheese in Eastern Ontario was 848,578 pounds, compared with factory-made cheese of about 3,900,000 pounds. Factory production of cheese had increased to 71,502,635 pounds by 1901, representing 68.1 per cent of the total factory-made cheese of Ontario. Such a phenomenal increase would not have been possible without the factory system. The number of cheese factories increased from 67 in 1870-1871 to 704 in 1900-1901, an increase of 950 per cent³. About 67 per cent of the provincial cheese factories were located in Eastern Ontario. The districts of Hastings (10,007,935 pounds), Leeds (9,091,898 pounds), Dundas (5,596,749 pounds), and Cornwall and Stormont (5,298,350 pounds) were among the largest producers of factory-made cheese not only in Eastern Ontario but in the province as a whole. Thus, by the end of the nineteenth century, cheese was mostly factory-made and its production fully commercialized.

¹ P.W. Bidwell and J.I. Falconer, History of Agriculture in the Northern United States 1620-1860 (Washington: Carnegie Institute, 1925), p. 422.

² Canada, Department of Agriculture, Census of Canada 1871, Vol. 3, (Ottawa: 1875), pp. 206-212, and pp. 368-372.

³ Ibid., pp. 206-212, and Canada, Department of Agriculture, Census of Canada, 1901, Vol. 3 (Ottawa: 1902), pp. 174-219.

It was of such a high quality that it earned a special reputation in the British market. Belleville alone in 1873 exported 3,935,111 pounds of cheese valued at \$442,760.¹ This amounted to one-fifth of the total cheese output of Ontario.

The Eastern Ontario butter-making industry also developed rapidly during 1851-1871. The Region produced 11,325,471 pounds of butter in 1870-71, compared with 6,624,097 pounds in 1850-1851.² The production of butter, however, did not increase much between 1871 and 1901 (i.e., only by 3.44 per cent). Butter from Eastern Ontario, although still homemade,³ enjoyed popularity in the U.S.A. and Great Britain. It was more expensive than that of Central and Western Ontario, but its higher price did not hinder its export, as it was of better quality.⁴ Butter from Dundas County was known in the U.S.A. under the label "Orange County". By 1865, butter from the Brockville district was well-known in the United Kingdom. During the 1870's butter from the Morrisburg district became so famous for quality and uniformity that it could be sold by cable at any town in the British market.⁵

¹Canada Farmer (February 16, 1874), p. 74, cited in R.L. Jones, op. cit., p. 260.

²Calculated from Census of the Canadas 1851-1852 and Census of Canada 1870-1871.

³Out of the 11,716,636 pounds of butter produced in the Region, 1900-1901, only 506,175 lbs. were manufactured in a factory, Census of Canada, 1901, Vol. 3, op. cit., pp. 174-219.

⁴It is said that a single retail firm in Perth gathered 2,800 boxes worth \$50,000 for sale to a firm in Montreal in 1871 and two firms in Renfrew shipped 20 carloads of butter direct to Liverpool in 1880. H.B. Small, Resources of the Ottawa District (Ottawa: The Times Printing Company, 1872), p. 34, and Albert Smallfield, Lands and Resources of the Renfrew District, Province of Ontario: A Handbook (Renfrew: 1881), p. 11.

⁵Canadian Farm, (July 15, 1872), p. 60, cited in R.L. Jones, op. cit., p. 263.

X.1.3 The Livestock Industry

Eastern Ontario agriculture in the second half of the nineteenth century also saw changes in the livestock industry. The industry became firmly established, and the quality of livestock was improved significantly after the 1850's because of rising domestic and American demand for an improved breed. Before the 1850's, livestock of an improved breed were imported from the U.S.A., but after that, these were replaced by domestic livestock. It is said that around the 1850's, all the old stock of sheep in Prince Edward County was sold and replaced by a new and better breed.¹

There were basically two factors responsible for the opening of the American market to the livestock of Eastern Ontario: (1) The American Civil War; and (2) the opening of railroads.

As the heavy requirements for horses, sheep and cattle created by the American Civil War could not be met domestically, the Americans turned to Canada. The building of American railways and their links with Canadian border cities, notably Brockville and Prescott, facilitated the movement of Canadian livestock to the U.S.A. (especially sheep and hogs which were difficult to drive). With the opening of the Ogdensburg Railway in the U.S.A., the price of cattle in the border cities in Eastern Ontario such as Brockville and Prescott rose rapidly and within a few weeks, farmers in these cities were sending their livestock to Boston.²

The Ottawa Valley and the Bay of Quinte areas were the main exporters of livestock to the U.S.A. In the Ottawa Valley, the County of Carleton and

¹Journal and Transactions of the Board of Agriculture of Upper Canada for 1855-1856, p. 34, cited in R.L. Jones, op. cit., p. 267.

²R.L. Jones, op. cit., p. 180.

the Town of Perth were well-known for exports of cattle. Cattle were sold mainly at fairs; it is believed that so many cattle were bought by Americans in the Perth area in 1850-1851 that hardly any cattle were left for the spring fair. The 348 cattle shipped from Hastings County in 1851¹ to the United States by steamer were but a fraction of those shipped across the St. Lawrence at Kingston or Gananoque.² In 1853, Prince Edward County exported about 10,500 fat and store sheep to the United States.³ In the 1870's, Carleton and Renfrew Counties each exported 10,000 lambs per year at a price ranging from \$5 to \$7 each.⁴

Effects of Livestock Exports to America

The first and foremost effect of the opening of the livestock trade was that it increased the size of the herds in Eastern Ontario. Lured by the higher prices and assured of the market for their livestock, farmers in the Region began raising horses, sheep, lambs, cows and swine in larger numbers. Livestock statistics given in Table 10.3 indicate that the number of horses doubled over the 1851-1901 period. Growth was particularly high during 1871-1901, despite an apparent decline between 1861-1871 owing to the exclusion from the Census of 28,277 colts from the category "horses". The number of sheep recorded increased throughout the period till-

¹Perth Bathurst Courier (May 2, 1851), cited in R.L. Jones, op. cit., p. 182.

²Canadian Agriculturist (July 1852), p. 199, cited in R.L. Jones, op. cit., p. 182.

³Journal of Transactions of the Board of Agriculture of Upper Canada, cited in R.L. Jones, op. cit., p. 185.

⁴R.L. Jones, op. cit., p. 278.

1871, after which it declined due to the decline in the American demand.

The number of milch cows increased by 276 per cent between 1851 and 1901.¹

The second effect of the expansion of the livestock industry was the increased demand for coarse grains to feed cattle. The rise in the production of oats during this period was partly due to this factor. Third, the rise of American demand for Canadian livestock may have been an additional factor in the expansion of railroads to the border cities.² Fourth, with the development of the market for cattle and horses, a market for hay also developed, although hay was too cheap and bulky to stand the expense of transportation. For the first time hay was exported to New York in 1852. With the opening of railroads that connected Rome, New York, with the eastern end of Lake Ontario, a hay market developed at Kingston for exports to New York.³ Finally, the livestock trade with the U.S.A. diversified farming in the Region and reduced farmers' dependence on field crops. Higher livestock prices presumably increased the level of income of farmers.

X.2 Organization of Farming

X.2.1 Land Area and Size of the Farm

The area of farmland occupied in the Region increased from 1,429,831 acres in 1851 (shown in Table 4.1 in Chapter IV) to 4,539,826 in 1871, which

¹It should be noted that the rapid increase in milch cows was not due to direct exports to America but indirectly to the development of dairying which became profitable with American demand.

²However, an equally strong counter argument can be made that railways opened the livestock trade with the U.S.A. It is difficult to explain "which" led to "what". As mentioned earlier, the need to tap the forest resources in the Ottawa Valley seems to be the most compelling factor for the building of railroads in Eastern Ontario.

³Canadian Agriculturist (December 1852), cited in R.L. Jones, op. cit., p. 182.

was an increase of 218 per cent over the twenty-year period (Table 10.2). The corresponding increase in land occupied during 1871 and 1901 was only 28.9 per cent, implying that the process of land settlement in Eastern Ontario had almost ceased by the last quarter of the nineteenth century. The area of improved land rose by 17.5 per cent during 1871-1901.¹ The area under crops increased to 2,096,183 acres in 1901, which was an increase of 40.3 per cent over the 1871 level of 1,493,256 acres; while the corresponding increase during 1851-1871 was 125 per cent. The increase in the acreage of cultivated land occurred mainly in barley and oat crops (Table 10.1).²

The size of farm per occupant rose from 35.83 acres in 1851 to 107.45 acres in 1871, an increase of 226 per cent; the corresponding increase for 1871-1901 was 22.4 per cent, the average size of farms in 1901 being 131.34 acres.

The number of farm occupants rose only 5.3 per cent between 1871 and 1901; suggesting that the increase in the size of holdings was due mainly to the fact that more land was brought into use. It is interesting to note that the size of land occupied per person was larger in Eastern Ontario than in the other regions of Southern Ontario. However, the land under crops per person was smaller in Eastern Ontario than in the other regions (Table 10.1). This means that the proportion of occupied land used for pasturing the cattle was higher in Eastern Ontario than in other regions of Southern Ontario. It may also mean that a large part of uncultivated land was unutilizable. These two may be the factors that required more occupied land to get a given level of usable land.

¹Corresponding figures for 1851 are not available.

²Data for barley acreage are not available for 1871. However, using the 1861 acreage figures, it becomes apparent that the barley acreage almost doubled between 1861-1901, i.e., 39165 acres to 76461 acres. Similarly, oats acreage went up from 192794 in 1861 to 629,083 in 1901.

TABLE 10.2

Land Statistics of Southern Ontario Regions for Years 1871 and 1901

	1871						
	Total Land Occupied (acres)	Improved Land (acres)	Land Under Crops (acres)	No. of Occupiers	Land Under Crops Per Occupier (acres)	Land Occupied Per Occupier	Land Under Crops as Percentage of Total Land Occupied
Eastern Ontario	4,539,826	2,071,026	1,493,726	42,249	35.34	107.45	32.89
Central Ontario	6,352,361	4,007,122	3,010,930	68,348	44.05	92.94	47.39
Western Ontario	5,169,033	2,741,325	2,019,895	60,677	33.28	85.18	39.07
Southern Ontario (Total)	16,061,220	8,819,473	6,526,081	171,264	38.09	93.78	40.36
1901							
Eastern Ontario	5,852,025	2,640,537	2,096,183	44,554	47.04	131.40	35.82
Central Ontario	8,466,966	5,964,498	3,785,561	71,020	53.30	119.22	44.71
Western Ontario	6,285,897	4,638,910	3,141,499	61,895	50.75	101.55	49.98
Southern Ontario (Total)	20,604,888	13,183,945	9,023,243	177,469	50.84	116.10	43.79

Source: Compiled from Censuses of Canada for the years 1871 and 1901, using Census district data

X.2.2 Mechanization

It seems that the extensive method of cultivation that was popular in the middle of the century, i.e., expanding output by increasing the amount of land under cultivation rather than by increasing the levels of other inputs such as capital, fertilizers or labour, continued to be used even up to 1901. Animal power was still the main source of power. The number of horses used as working animals rose from 86,703 in 1871 to 134,569 in 1901¹ (Table 10.3). Defining mechanization in the nineteenth century as the greater use of farm machinery, and the use of more horse-power to pull agricultural machines, such as horse-rakes, harvesters, rake reapers and automatic knotters, implies that mechanization of Eastern Ontario agriculture had already started in the last quarter of the last century. By the same token the use of oxen may perhaps indicate the lack of mechanization as they were used to pull the traditional ploughs and for haulage. The census figures for working oxen for all the census years during the latter half of the century (except for 1901 when data for oxen do not seem to have been collected) indicate a continuous decline in the use of oxen. For example, 1,361 oxen were reported in 1891, compared with 7,620 in 1871, 16,951 in 1861, and 45,317 in 1851. This declining trend in the use of oxen as the working animal, accompanied by a greater use of horses as the working animal, means that, in terms of greater use of better agricultural implements, farming was already in the process of being mechanized

¹The figures for 1901 relate to horses 3 years or more on farms and lots. It reaches as high as 161,945 when those below 3 years are included (See Census of Canada 1901, Vol. 2, op. cit., pp. 202-206).

TABLE 10.3

Livestock Statistics, Eastern Ontario, For
the Various Census Years

	<u>1851</u>	<u>1861</u>	<u>1871</u>	<u>1901</u>
Oxen	45,317	16,951	7,620	-
Horses	66,811	112,115	86,703*	134,569**
Milch Cows	102,644	139,027	192,689	386,276
Sheep	302,824	330,787	368,457	226,004
Swine	152,409	142,326	13,421	3,767

Source: Census of Canada for various years.

*Does not include 28,277 colts

**Does not include 27,376 horses 3 years or less.

in the second half of the nineteenth century.¹

The extent of mechanization in Eastern Ontario can also be judged by the number of agricultural implements used by the farmers. Unfortunately, the census figures for agricultural implements are available only for the year 1871, and thus, the speed of the process of mechanization cannot be known. The Census of 1871 reported 5,697 reapers and mowers, 3,660 threshing mills, 8,305 horse rakes and 25,753 fanning mills. The Census also reported 28 firms that manufactured agricultural implements, and provided employment to 288 workers. All these statistics indicate that mechanization in the last quarter of the nineteenth century was not unknown to the farmers in Eastern Ontario and had become a part of their farming technology.

X.3 Summary

Agriculture in Eastern Ontario, therefore, differed significantly from that in Central and Western Ontario. The relatively cold climate of the Region discouraged growing fall wheat and the relatively poor quality of land discouraged wheat growing in general. Barley and oats became important crops of the Region because of the rising American demand. Dairy products, notably butter and cheese, became leading exports. As a result of American demand for livestock and the rising dairy industry, the domestic livestock industry also enjoyed a period of prosperity.

¹ There was also an indirect indication of agriculture being mechanized. During 1871-1901, land under crops rose by 35 per cent, the number of horses increased by 56 per cent, and the number of oxen disappeared. Assuming 1 ox = 1 horse, the net increase in tractive power was about 48 per cent, or put in another way, animal tractive power per cultivated acre in the Region increased by 10 per cent between 1871-1901, and at the same time land under crops per occupier in the Region increased by roughly a third. If one takes into account effects on horse population size of U.S. demand, there is some evidence of mechanization during 1871-1901.

Although the land occupied per person was larger in Eastern Ontario than in the other regions, the reverse was the case with regard to the amount of land under crops per person. Yield per cultivated acre was also smaller in the Region than in the other regions of Southern Ontario.

On the whole, agriculture in Eastern Ontario enjoyed prosperity during this period, compared with the first half of the nineteenth century. It was also diversified. However, it still lagged behind the other regions in Southern Ontario.

CHAPTER XI

Manufacturing 1851-1901XI.1 Introduction

Up to the middle of the nineteenth century, manufacturing in Eastern Ontario remained principally a village handicraft carried on at homes or in small workshops that provided services (e.g., blacksmithing, sawing, flour milling, repairing, etc.) to local farmers, lumberers and other settlers. Manufacturing activity was spread throughout the Region because of its close link with agriculture and forest industries, and also because of an inadequate transportation network in the interior. Dependence of manufacturing on waterfalls as a source of power also compelled scattering of firms to location of water power sites. Consequently, and because of the limited size of local markets, manufacturing workshops in general did not develop into large factories. Because the manufacturing establishments were largely service industries, their growth did not significantly stimulate the growth of population; rather, their growth depended on population growth. With the opening of the American market in the second half of the century, however, some industries such as sawmilling assumed the role of "propelling industries", i.e., industries that did not follow population growth but rather stimulated it. Unlike square timber, the products of these industries had a high value-added content, and consequently these industries had strong inter-industry linkages with the rest of the economy.

Manufacturing in Eastern Ontario developed under greatly changed conditions after 1851. Water power began to be supplemented and replaced by steam and, as wood was gradually used up, coal took the place of wood as a fuel. A great number of changes occurred as a result of the construction of canals and the building of railways. Transportation became cheaper and it became possible to ship coal to the interior of the Region from Nova Scotia but mostly from the U.S.A. Similarly, it became physically possible and economically profitable to obtain raw materials from, and sell products to different parts of the country, which expanded the size of markets. The square-timber trade to the U.K. had reached its peak, while the lumber trade to the U.S.A. was still rising. The Reciprocity Treaty (1854-66), and the National Policy after Confederation were two commercial and political events that affected the manufacturing growth of the Region in this period.

Under these conditions, therefore, the major urban centres of the Region became potential areas for manufacturing, especially Ottawa, Kingston, Brockville and Cornwall. The domestic market expanded for a few manufactured goods and foreign demand for sawn lumber, cheese and butter increased dramatically. Also, the potential existed for the concentration of manufacturing establishments which would reap the advantages of economies of scale.

This chapter will examine the performance of the manufacturing sector of the Region under these new circumstances in relation to the manufacturing sectors of other regions of Southern Ontario in the second half of the nineteenth century. It will also analyze the factors influencing manufacturing activity in the Region and determine whether or not the process of concentration actually took place in or outside the Region.

XI.2 Growth of Manufacturing Output, Capital and Employment

In 1871,¹ the gross value of total manufacturing output in Southern Ontario amounted to about 140 million constant (1935-1939) dollars (Table 11.2). Manufacturing in the Eastern Ontario Region accounted for about 20 per cent of this total. The figure was reduced to 17.2 per cent in 1881 and 17 per cent in 1901, although in 1891 its share had risen to 18.5 per cent.²

In terms of capital, the share of the Region was also falling. In 1871, the Region possessed about 10.4 million (1935-1939) dollars worth of capital stock, accounting for 25.2 per cent of the total capital stock of Southern Ontario. Although the capital stock of the Region had increased in value by 1881 by 116 per cent over the 1871 figure, it only amounted to 20.5 per cent of the total for Southern Ontario. By the end of the nineteenth century, its share had fallen to 18 per cent of the total capital stock of Southern Ontario. During the 1871-1901 period, the capital stock in Eastern Ontario increased by 634 per cent (Table 11.3), while the corresponding rates in the Central and Western regions of Southern Ontario during the same period were 1101 and 817 per cent, respectively.

Eastern Ontario also lagged behind its sister regions of Central and Western Ontario in terms of employment growth and its share of total employment of Southern Ontario. For example, employment in manufacturing in

¹As the manufacturing statistics for 1851 are not complete and reliable, comparison of the 1871 figures is not made with those for 1851.

²Due to changes in the Census coverage of manufacturing establishments in 1901, comparison of manufacturing statistics for 1901 with earlier censal years becomes impossible. The reported figures for the 1901-1902 Census (marked by single asterisks in Table 11.1) have been adjusted (marked by double asterisks in Table 11.1).

Footnote No. 2 Cont'd

The 1901-1902 Census did not report statistical information about manufacturing establishments employing less than five workers. In order to compare them roughly with those for the preceding years, manufacturing statistics - number of establishments; employment, capital, value of output, etc. - of firms employing less than five workers have been estimated for 1901-1902 by applying the 1891 ratio of statistics of firms hiring less than five workers and those employing five workers or more (as reported in Table XXII in the 1891 Census) to the figures for manufacturing establishments employing five workers or more (as reported in the 1901 Census). These estimated statistics have been added to the reported statistics of establishments employing five workers or more in order to arrive at an estimate of manufacturing statistics for all establishments. The estimates thus arrived at are a rough measure of the manufacturing activity of the Region in 1901 and should be interpreted cautiously, as they suffer from the following defects.

First, the ratios used to estimate total manufacturing activity of Eastern Ontario are based on figures for Canada as a whole and they assume the same establishment size structure at the national and the regional levels.

Second, the ratios are based on all manufacturing industries and not on each individual manufacturing industry because individual manufacturing industry statistics are not treated consistently in all cases in the 1901 census. For example, log products statistics are given for the Cornwall and Stormont census divisions; but in the case of Carleton, the statistics of the log products industry are included in "all other industries" and, thus, it becomes impossible to get total regional figures for a particular industry.

Third, the ratios assume no change in the proportionate distribution of size of firms between 1891 and 1901; for example, if in 1891, 80 per cent of all manufacturing establishments employed less than five workers and accounted for 25 per cent of total manufacturing employment, and 20 per cent of total wages and salaries, it is assumed that the same proportions hold true for 1901-1902.

Finally, application of the ratio method makes it difficult to take into account changing rates of "amalgamation effects" or "decay effects" of establishments employing less than five workers between 1891-1901, as it assumes that ratio is constant. The estimated statistics for 1901 are, thus, highly speculative and, hence, should be used with great caution and restraint.

TABLE 11.1

Manufacturing Sector in Eastern and Other
Planning Regions in Southern Ontario for Various Years
(Current Dollars)

Region and Year	Total Value of Output (O)	Total Capital Invested (K)	No. of Workers Employed (L)	Amount of Yearly Wages (W)	Value Added (VA)	No. of Enter- prises (N)	VA/L	K/L	W/L	VA/N	O/N	K/N	L/N
Eastern Ont.	\$	\$		\$	\$		\$	\$	\$	\$	\$	\$	
1871	22,516,817	8,447,915	20,068	4,511,113	8,865,409	4,595	442	421	225	1,929	4,900	1,839	4.38
1881	26,777,096	16,267,281	25,770	5,794,528	10,877,978	5,262	422	631	225	2,067	5,089	3,052	4.90
1891	42,790,170	32,661,871	34,707	9,661,698	18,270,253	7,076	526	942	278	2,582	6,047	4,616	4.90
1901*	40,076,685	38,143,544	28,853	8,772,000	16,143,414	1,746	559	1,321	304	9,246	22,953	21,846	16.35
1901**	51,053,101	48,590,501	39,202	11,103,797	20,421,000	9,400	521	1,240	283	2,172	5,431	5,170	4.17
Central Ont.													
1871	64,929,090	20,796,413	47,681	11,855,690	27,350,949	8,545	574	436	249	3,201	7,599	2,434	5.58
1881	83,328,543	43,812,282	60,651	16,638,697	34,943,862	10,629	576	722	274	3,288	7,840	4,122	5.71
1891	130,128,221	92,999,957	87,342	27,410,645	63,066,250	14,575	722	1,065	314	4,327	8,929	6,381	5.99
1901*	146,853,279	135,596,026	100,589	35,308,806	62,221,453	2,952	620	1,348	351	21,114	49,747	45,933	34.00
1901**	187,074,241	172,733,791	136,660	44,694,691	74,829,696	15,900	548	1,264	327	4,706	11,765	10,864	8.59
Western Ont.													
1871	26,202,634	6,953,180	18,927	4,480,366	11,363,195	5,136	600	367	238	2,212	5,101	1,354	3.68
1881	45,176,093	19,195,628	29,643	7,627,774	18,548,252	6,687	626	648	257	2,774	6,756	2,871	4.43
1891	55,579,522	38,176,015	37,918	10,574,850	24,233,429	8,935	639	1,007	279	2,712	6,220	4,273	4.24
1901*	46,091,117	39,243,803	31,632	9,854,874	20,437,423	1,625	474	1,241	312	9,229	28,364	24,150	19.46
1901**	58,714,798	49,992,105	42,978	12,474,524	26,034,933	8,800	606	1,163	290	2,958	6,672	5,680	4.88
Southern Ont. (All Regions)													
1871	113,648,541	36,197,508	86,676	20,847,169	47,579,554	18,275	549	418	240	2,603	6,220	1,980	4.74
1881	155,281,732	79,275,181	116,064	30,060,999	64,370,092	22,578	555	683	258	2,851	6,880	3,511	5.15
1891	228,407,917	163,837,743	159,963	47,647,193	105,569,922	30,586	660	1,024	298	3,452	7,469	5,356	5.23
1901*	233,021,081	212,983,373	161,074	53,975,219	98,802,290	6,323	574	1,322	335	14,782	35,271	33,683	25.47
1901**	296,842,140	271,316,397	218,835	68,273,012	121,285,629	34,100	554	1,280	312	3,557	8,705	7,956	6.42

Sources: Calculated from Census of Canada, 1871, 1881, 1891, 1901.

* based on statistics of firms employing 5 workers or more, as reported by the Census.
** based on estimated figures of all manufacturing firms. See footnote on page 137 for the estimation methodology and its drawbacks.

Table 11.2

Manufacturing in Eastern Ontario and Other Planning Regions of Southern Ontario

Selected Years

(Constant 1935-1939 dollars)

Region and Year	O	K	L	W	VA	N	VA/L	K/L	W/L	VA/N	O/N	K/N	L/N
Eastern Ontario													
1871	\$ 27,695,961	\$ 10,391,039	20,068	\$ 5,548,724	\$ 10,904,562	4,595	\$ 543	\$ 518	278	\$ 2,372	\$ 6,027	\$ 2,262	4.38
1881	36,984,929	22,468,620	25,770	8,003,492	15,024,831	5,262	583	872	311	2,855	7,029	4,215	4.90
1891	63,770,745	48,661,871	34,707	14,399,953	27,228,394	7,076	784	1,402	415	3,848	9,012	6,877	4.90
1901*	62,914,733	58,879,974	28,853	13,770,800	25,342,879	1,746	878	2,040	477	14,515	45,903	33,722	16.45
1901**	80,146,155	76,280,221	39,202	17,431,292	32,056,515	9,400**	818	1,946	446	3,410	8,526	8,115	4.40
Central Ontario													
1871	79,863,579	22,579,843	47,681	14,582,644	33,642,003	8,545	706	536	366	3,937	9,347	2,994	5.58
1881	115,094,670	60,514,201	60,651	22,981,625	48,265,002	10,629	795	997	378	4,541	10,828	5,692	5.71
1891	193,931,775	138,599,041	87,342	40,850,439	93,988,450	14,575	1,076	1,586	467	6,488	13,305	9,509	5.99
1901*	230,538,900	212,806,660	100,589	55,429,836	97,678,890	2,952	1,118	2,116	551	33,095	78,095	70,884	34.00
1901**	293,680,127	271,167,647	136,579	70,164,350	117,472,050	15,900	860	1,985	513	7,388	18,470	17,054	8.59
Western Ontario													
1871	32,229,597	8,552,496	18,927	5,510,905	13,976,869	5,136	738	451	293	2,720	6,274	1,665	3.68
1881	62,397,918	26,513,298	29,927	10,535,599	25,619,132	6,887	864	895	355	3,831	9,331	3,965	4.43
1891	82,830,882	56,894,210	37,918	15,759,836	36,115,393	8,935	952	1,500	415	4,042	9,270	6,367	4.24
1901*	72,356,554	61,607,226	31,632	15,470,760	23,544,276	1,625	744	1,947	489	14,488	44,527	37,912	19.46
1901**	92,173,937	78,449,144	42,978	19,583,240	40,871,166	8,800	950	1,825	455	4,644	10,474	8,915	4.88
Total, Southern Ontario													
1871	139,789,137	41,523,378	86,676	25,642,273	58,523,434	18,276	675	514	295	3,201	7,650	2,272	4.74
1881	214,477,527	109,496,119	116,348	41,520,716	88,908,965	22,578	764	941	357	3,937	9,502	4,850	5.14
1891	340,399,280	244,169,512	159,963	71,009,229	157,332,238	30,586	983	1,526	444	5,143	11,124	7,983	5.23
1901*	350,111,219	334,553,804	161,074	84,733,468	146,738,730	6,323	911	2,076	526	23,207	55,371	52,879	25.47
1901**	466,000,219	425,929,410	218,759	107,178,983	190,401,301	34,100	870	1,947	490	5,584	13,655	12,450	6.42

*Refers to figures of manufacturing establishments hiring 5 workers or more, as reported by the 1901 Census.

**Refers to estimated figures of all manufacturing establishments.

***This figure appears to be overestimated as the average size of establishments in Ottawa was much larger than the national average.

Source: (1) Table 11.1.

(2) Canada, Statistics Canada, Prices and Price Indexes, 1951, Catalogue No. 62-002 (Ottawa, 1952), pp. 24-26.

Table 11.3

Percentage Changes in the Manufacturing Sector of Eastern Ontario and other Regions
of Southern Ontario, for Various Years

(constant 1935-1939 dollars)

Region and Period	O	K	L	M	VA	N	VA/L	K/L	M/L	VA/N	O/N	K/N	L/N
Eastern Ontario													
1871-1881	\$ 33.53	\$ 116.23	28.41	\$ 44.24	\$ 37.38	14.51	\$ 7.36	\$ 68.33	\$ 11.87	\$ 20.36	\$ 16.62	\$ 86.33	11.87
1881-1891	66.23	166.00	34.67	79.92	31.23	34.20	34.48	60.77	33.44	34.78	28.21	63.15	0.0
1891-1901*	25.60	56.75	12.95	21.05	17.73	32.84	4.34	31.45	7.47	-11.38	-5.39	18.02	-10.20
1871-1901*	189.38	634.09	95.35	214.18	193.98	104.57	50.64	275.67	60.43	43.76	41.46	258.75	0.46
Central Ontario													
1871-1881	31.21	168.00	27.20	57.59	43.46	24.38	12.60	86.00	23.52	15.34	15.84	90.11	2.33
1881-1891	68.49	120.80	44.00	77.75	94.73	37.12	30.44	59.07	23.54	42.87	22.87	66.05	4.90
1891-1901*	51.43	75.64	56.37	71.76	24.88	9.09	-14.78	25.16	9.85	13.87	70.51	79.34	43.41
1871-1901*	267.72	1100.96	186.44	381.86	249.18	86.07	21.81	270.33	40.16	87.65	97.60	469.60	53.94
Western Ontario													
1871-1881	93.60	210.00	56.61	91.17	163.29	30.20	17.07	98.44	21.16	40.84	48.72	138.13	20.38
1881-1891	32.74	114.59	27.98	49.58	49.58	33.58	10.18	67.59	16.90	5.51	-0.65	60.58	-4.29
1891-1901*	11.28	37.88	13.34	24.26	24.26	-1.51	-0.20	22.66	9.63	14.89	12.99	40.02	15.09
1871-1901*	166.00	817.31	127.07	255.40	192.43	71.33	29.00	304.65	55.29	70.73	66.95	435.43	30.43
Total Southern Ontario													
1871-1881	53.42	163.69	33.83	61.92	51.92	23.53	13.48	83.46	21.01	22.99	24.20	113.46	8.44
1881-1891	58.71	123.00	37.49	71.02	76.96	35.46	28.32	61.82	24.36	30.63	17.12	58.69	1.75
1891-1901*	36.89	74.44	36.75	50.93	21.04	11.48	-11.50	27.59	10.36	13.55	22.69	64.63	22.75
1871-1901*	233.36	925.76	152.39	317.98	225.34	86.58	28.89	278.79	66.10	82.44	78.49	412.93	35.43

* Estimated figures. See footnote on page 137 for details on estimation, methodology and reliability.

Source: Calculated from Table 11.2.

the Region increased by 95 per cent during 1871-1901, while the corresponding growth rates in the Central and Western regions were 186 and 127 per cent, respectively (Table 11.3). The depression of the early 1890's severely affected the Region's manufacturing growth. Eastern Ontario witnessed a growth rate in manufacturing employment only 13 per cent during 1891-1901, while, during the same period, the Central Ontario Region managed to increase its employment by 56 per cent, and the Western Region by 13 per cent. Manufacturing employment growth rates of the Region during 1871-1881 and 1881-1891 were, nonetheless, much higher than those in 1891-1901.

Throughout this period, Eastern Ontario continued to lose its share of the total manufacturing employment of Southern Ontario. In 1871, the Region's manufacturing employment constituted 23 per cent of the total manufacturing employment of Southern Ontario. The percentage decreased to 22 in 1881, to 21 in 1891 and to 18 in 1901 (calculated from Table 11.2).

The number of establishments in Eastern Ontario had grown to 4,595 by the year 1871. This constituted about 25 per cent of the total number of establishments in Southern Ontario. From 1871 to 1881, manufacturing establishments in the Region increased by 14.5 per cent (See Table 11.3), and rose by 34 per cent in the period 1881-1891 and by 32 per cent in 1891-1901.¹ However, as Table 11.4 indicates that after 1891, the growth rates of some of the manufacturing industries began to slow down. Table 11.4 shows that with the exception of cheese making, printing and publishing, distilleries, and boot and shoe making, almost every industry in the Region recorded a decline in the number of establishments.

¹The rapid growth rate of the number of establishments between 1891-1901 is based on the estimated figures for 1901 which are at best crude. The lower growth rates of output and value added as compared to those of number of manufacturing establishments in 1891-1901 suggests that, perhaps, number of manufacturing firms was overestimated.

TABLE 11.4

Major Industries, Eastern Ontario For The
Years 1861, 1871, 1881, 1891

	1861	1871	1881	1891
<u>Flour & Gristmills</u>				
No. of Establishments	108(100)	211	207	197
Employment	339	492	662	801
Value of Output	1,193,778	4,925,964	3,555,299	4,129,100
<u>Sawmills</u>				
No. of Establishments	(191)	402	363	318
Employment	2,764	4,223	1,858	7,442
Value of Output	1,108,618	4,803,798	5,527,917	7,474,831
<u>Woollen Cloth Making</u>				
No. of Establishments	17	46	372	81
Employment	221(186)	1,071	1,837	1,494
Value of Output	300,867	1,441,266	2,149,633	1,677,702
<u>Foundries</u>				
No. of Establishments	40	66	64	65
Employment	355	1,119	834	1,008
Value of Output	389,010	1,089,316	780,185	1,099,805
<u>Cheese Factories</u>				
No. of Establishments	-	67	218	471
Employment	-	208	555	889
Value of Output	-	434,376	1,489,734	3,403,869
<u>Agricultural Implements</u>				
No. of Establishments	-	28	28	21
Employment	-	228	541	418
Value of Output	-	218,027	614,965	662,887
<u>Cotton Mills</u>				
No. of Establishments	-	-	3	3
Employment	-	-	736	1,501
Value of Output	-	-	883,000	1,585,892
<u>Boots and Shoes</u>				
No. of Establishments	-	518	462	472
Employment	-	1,244	985	652
Value of Output	-	881,680	718,151	520,213
<u>Breweries</u>				
No. of Establishments	18	17	16	13
Employment	67	80	124	116
Value of Output	93,226	184,206	253,630	311,785
<u>Tanneries</u>				
No. of Establishments	95	147	99	79
Employment	221	435	308	217
Value of Output	719,780	784,247	538,658	416,105
<u>Distilleries</u>				
No. of Establishments	12	2	3	4
Employment	not reported	43	65	76
Value of Output	171,222	246,500	267,300	463,800
<u>Printing & Publishing</u>				
No. of Establishments	-	40	47	51
Employment	-	367	661	456
Value of Output	-	379,031	514,543	490,199
<u>Carding & Fulling</u>				
No. of Establishments	17(13)	71	44	21
Employment	63(51)	154	74	37
Value of Output	-	278,917	111,324	45,968

Source: Census of Canada, 1861, 1871, 1881

Figures in parentheses are for reporting firms.

Table 11.5
Manufacturing Industries in the Urban Centres
of Eastern Ontario with Population 1,500
or Over, for 1881, 1891 and 1901
 (in constant (1935-1939) dollars)

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	1881				1891			
	No. of Establishments	No. of Workers	Gross Value of Output	Population	No. of Establishments	No. of Workers	Gross Value of Output	Population
Alexandria	12	30	55,812	1,200	52	180	377,453	1,614
Almonte	58	622	101,381	2,684	77	708	1,293,715	3,071
Arnprior	28	845	694,061	2,147	49	1,215	2,141,452	3,341
Belleville	132	964	150,840	9,516	197	1,095	1,809,382	9,916
Brockville	73	803	1,254,641	7,609	135	1,161	2,093,350	8,791
Carleton Place	28	409	787,942	1,975	88	906	1,493,557	4,435
Cornwall	23	1,054	1,818,938	4,468	108	1,755	3,195,198	6,805
Gananoque	63	541	1,052,134	2,871	72	809	1,592,061	3,669
Hawkesbury	29	538	724,157	1,920	35	472	913,308	2,042
Kemptville	-	-	-	-	-	-	-	-
Kingston	187	1,472	2,177,149	14,019	401	2,671	4,640,198	19,263
Morrisburg	35	143	135,911	1,719	52	161	532,508	1,859
Napanee	90	565	933,567	3,680	84	406	688,311	3,434
Ottawa	302	4,242	7,277,723	31,307	553	6,683	13,147,620	44,154
Pembroke	62	369	662,459	2,820	98	594	985,025	4,401
Perth	77	309	412,785	2,467	70	385	107,642	3,136
Picton	71	365	510,588	2,975	105	617	890,792	3,287
Prescott	38	212	584,634	2,997	67	334	901,808	2,919
Renfrew	61	214	401,577	1,605	69	243	459,574	2,611
Smiths Falls	33	339	499,192	2,087	91	627	1,440,171	3,864
Trenton	37	708	742,983	3,042	62	1,087	1,123,928	4,363
Vankleek Hills	-	-	-	-	-	-	-	-

	1901*				1901			
	No. of Establishments	No. of Workers	Gross Value of Output	Population	No. of Establishments	No. of Workers	Gross Value of Output	Population
Alexandria	16	234	429,701	1,901	3	172	214,870	1,901
Almonte	54	912	1,691,447	3,027	10	671	845,800	3,027
Arnprior	43	853	2,234,447	4,152	8	628	1,177,322	4,152
Belleville	130	738	1,717,799	9,117	24	543	558,950	9,117
Brockville	124	1,535	3,102,900	8,940	23	1,130	1,551,590	8,940
Carleton Place	81	500	785,456	4,059	15	368	392,735	4,059
Cornwall	173	2,200	4,319,229	6,704	32	1,619	2,159,809	6,704
Gananoque	86	916	1,726,002	3,526	16	674	863,079	3,526
Hawkesbury	27	1,076	220,190	4,150	5	798	1,101,049	4,150
Kemptville	43	644	213,074	1,523	8	74	106,547	1,523
Kingston	227	2,031	4,089,977	17,961	42	1,495	2,045,173	17,961
Morrisburg	16	31	112,190	1,693	3	23	56,100	1,693
Napanee	130	346	460,272	3,143	24	255	230,157	3,143
Ottawa	1,124	9,356	15,276,001	59,928	208	6,886	7,638,688	59,928
Pembroke	130	679	1,233,056	5,156	24	500	616,581	5,156
Perth	119	412	546,689	3,588	22	303	273,369	3,585
Picton	59	814	736,247	3,698	11	599	368,157	3,698
Prescott	38	182	383,164	3,019	7	134	191,600	3,019
Renfrew	27	221	758,980	3,153	5	163	379,525	3,153
Smiths Falls	60	1,077	794,078	5,155	11	793	1,397,075	5,155
Trenton	49	1,054	1,325,230	4,217	9	776	662,675	4,217
Vankleek Hills	49	225	201,695	1,674	9	116	100,857	1,674

Source: Canada, Department of Agriculture, Fourth Census of Canada (Ottawa: Printer to the King's Most Excellent Majesty, 1904).

* Modified statistics to take into account the contribution of manufacturing establishments not reported by the 1901 Census, i.e., the establishments employing fewer than five workers. The estimation procedure (described earlier on page 137) overestimates the figures for Ottawa, where the average size of sawmills was much larger than the national average and also where the ratio of manufacturing establishments employing fewer than five workers to those employing five workers or more was lower than it was in other places in Eastern Ontario.

The decline was greatest in the woollen cloth mills which had mushroomed during 1871-1881 due to the protective tariffs of the National Policy announced after the general election of 1878. However, because of the small size of the firms, the Eastern Ontario Region could not benefit from the tariffs as much as the Central and Western Regions of Southern Ontario.

After 1891, the process of modern industrialization, already slow in Eastern Ontario, slowed down still further. In the Central and Western Regions of Southern Ontario, slow growth of the number of manufacturing establishments accompanied by a rapid rise in the value of the gross output and employment indicates a relatively higher trend of integration of manufacturing establishments than in Eastern Ontario (see Table 11.3).

XI.3 Type and Spatial Location of Manufacturing Industries

According to the census figures for the period 1861-1891, manufacturing in Eastern Ontario consisted mainly of the following industries (in descending order of importance measured in terms of employment provided in 1891): sawmills, cotton mills, woollen and clothing mills, foundries, cheese factories, flour and gristmills, boot and shoe factories, printing and publishing establishments, manufacturers of agricultural implements, tanneries, breweries, distilleries, and carding and fulling mills (Table 11.4).

As Table 11.4 clearly indicates,¹ sawmills dominated the manufacturing sector throughout the period. They employed 2,764 workers in 1861 and by 1891,¹ the figure had risen to 7,442, an increase of 169 per cent. In 1891, the last year for which comparable figures for manufacturing industries are available, sawmills alone accounted for 21.4 per cent of the manufacturing

¹Comparable figures are not available for the 1901 Census.

employment in the Region (Tables 11.2 and 11.4). Their contribution to the manufacturing output of the Region was 17.4 per cent. Sawmilling operations were highly concentrated in Ottawa. In 1891, sawmills in Ottawa alone employed 2,676 workers (i.e., 36 per cent of all employees of sawmilling in the Region) and produced output of a gross value of \$2.8 million i.e., 35 per cent of all manufacturing output for Ottawa (See Profile of Ottawa in the Appendix).

Flour and gristmilling was the second largest manufacturing industry in the Region through the period 1861-1891 in terms of value of output, but in terms of employment cotton milling was the second largest manufacturing industry. Flour and gristmills were spread throughout the Region, as they served local markets, while cotton mills were concentrated at Cornwall, Stormont and Kingston. A mill at Kingston was established after 1879 when the National Tariff Policy provided protection to domestic industries. In 1891, two cotton mills in Cornwall produced a gross output of \$1.3 million, and employed 1,191 workers, i.e., 46 per cent of the total manufacturing employment of the town (see Manufacturing Profile of Cornwall in the Appendix).

The growth of the woollen cloth industry in the Region was phenomenal between 1861 and 1881. In 1861, seventeen woollen mills produced cloth worth \$300,867 and employed 221 workers; the corresponding figures for 1881 were 363 mills, \$2,149,633 and 1,837 workers. It seems that the sudden rise in the number of woollen mills was because of the National Tariff Policy. However, the industry had declined in 1891 when the number of establishments, workers, and the value of output fell respectively, to 81, 1,494 and \$1,677,702 (Table 11.4). This decline was due to stiff competition provided by mills located in Central and Western Ontario. This industry was located in Lanark Town, Cornwall, Almonte, Arnprior and Carleton Place (See the Appendix).

Brewing was another industry which grew rapidly with the settlement of the Region. By virtue of its consumer market and early beginning, it was widely distributed throughout the settled area before the railways were developed. The peak number was reached in 1871. Except for a few centres, it is not possible to locate the production centres for breweries, with the census data available. Gilmour, however, with the help of local directories, has identified 20 towns in Southern Ontario which were brewing continuously between 1851 and 1895.¹ Of these, five were in Eastern Ontario, Belleville, Kingston, Ottawa, Perth and Prescott. Brockville and Trenton were two more brewing centres where brewing started after 1851. With the exception of Ottawa and Perth, these centres were all major port cities along the St. Lawrence-Lake Ontario waterway.

The Region lost two breweries between 1871 and 1881, and three between 1881-1891. This indicates that the process of "elimination", as Gilmour calls it, was at work.² The Region perhaps lost its brewing establishments to Toronto in the West and Montreal in the East. The counties that lost brewing plants between 1871 and 1891 were: Carleton, Addington, Frontenac, Hastings and Prince Edward.³ However, three of the counties, Renfrew, Lennox and Leeds, gained brewing plants in the same period.

The agricultural implement industry, though not a major industry of the Region, played an important role in its agricultural development.

¹J.M. Gilmour, op. cit., p. 156.

²The perpetual transition from dispersal to absolute concentration is described as a "dilution" or "elimination" process. This consists of gradual elimination of production sites. J.M. Gilmour, op. cit., p. 98.

³Ibid., p. 159.

Moreover, this was one of the few industries which developed as a consequence of the backward linkages of agricultural operations. In 1881, twenty-eight establishments were manufacturing agricultural implements in Eastern Ontario; most of them concentrated in Grenville and Brockville. By 1891, this number had dwindled to 20, indicating joint tendencies toward "concentration" and "elimination". The level of output and employment, however, went up from \$218,027 and 228 respectively in 1871 to \$662,887 and 418 in 1891 (Table 11.4).

Table 11.5 gives the manufacturing statistics for 1881-1901 for the urban centres in the Region. The figures for 1901, which included establishments with five workers or more, were made approximately comparable (by the method described in footnote on page 137) to statistics reported in earlier censuses. The Table clearly indicates rapid growth rates in the number of establishments, gross value of output in constant (1935-1939) dollars, and the number of employees for 1881-1891, but relatively slow growth rates for 1891-1901. In fact, with the exception of Ottawa, almost every urban centre in the Region experienced a decline in the number of manufacturing establishments between 1891 and 1901. Some of the centres such as Belleville, Prescott, Smiths Falls, Picton and Perth even suffered an absolute decline in the estimated gross value of output in constant (1935-1939) dollars. Also a decline in the level of employment was recorded by Renfrew, Prescott, Napanee, Morrisburg, Kingston, Carleton Place, and Belleville. Most of these centres were timber towns that suffered a decline owing to the slowing down of square-timber operations. This decline seems partly due to the process of concentration of firms in a limited number of places, especially those in Central Ontario, and shift of firms from small centres to large centres, and partly due to slowing down of manufacturing

activity in general in the 1890's, and finally, perhaps, due to estimation error.

The first reason is suggested by the fact that while most of the major urban centres of Eastern Ontario suffered a loss in manufacturing employment and output (Table 11.5); those of Central Ontario gained in terms of both employment and the value of output. Neither Toronto, Hamilton nor Peterborough experienced any decline either in employment or in the gross value of output; instead they gained between 1891-1901 in both according to the adjusted and unadjusted figures.¹ This perhaps indicates that some of these centres gained at the expense of small places in Eastern Ontario. It is not clear how much of the real decline in manufacturing activity in these minor urban centres was due to the decay of manufacturing establishments arising from competition provided by Toronto, Hamilton and other major centres of Central and Western Ontario or to their shift to these centres. However, indications are that Toronto firms purchased factories in smaller centres and moved them to Toronto; for example, Massey was moved from Newcastle to Toronto in 1879,² and a carpet factory near Elora was moved to Toronto about 1874.

Brewing provides an example of the concentration of manufacturing industries outside the Region; as the population became concentrated in major urban centres, so did breweries. Two production centres, Toronto and London, accounted for over half of the brewing industry of Southern Ontario.³ However, in the case of Eastern Ontario (as discussed earlier), there was no

¹For example, in Toronto, even according to the 1901 (unadjusted) figures, a decline in the number of manufacturing establishments by 66 per cent between 1891-1901 was accompanied by an employment increase of 61 per cent and by an output increase of 88 per cent. Canada, Census of Canada 1901, (Ottawa: Printer to His King's Excellent Majesty, 1904), pp. 174-191.

²J.M. Gilmour, op. cit., p. 177.

³J.M. Gilmour, op. cit., p. 157.

proof of concentration of the brewing industry. Lack of concentration in all manufacturing industries (with the exception of sawmilling) in Eastern Ontario is suggested by Gilmour in his remark, "when all the (industrial) groups are considered for 1891, it is found that real concentration is only in three units - York, Wentworth and Waterloo."¹

The shift of production from small to large urban centres was evident from the decline in the manufacturing activity of a large number of small centres between 1891-1901 (Table 11.5), the decline being more apparent in centres with a population between 1,500 and 5,000, than in those with a population of 5,000 or more (e.g. Brockville, Belleville, Kingston, Cornwall, Smiths Falls). The total number of manufacturing establishments in all centres with a population of 5,000 or more increased from 1,394 in 1891 to 1,838 in 1901² while in centres with a population of 1,500 or less, they declined from 1,071 in 1891 to 935 in 1901 (calculated from Table 11.5), with the same number of urban centres with population between 1,500 and 5,000. However, these statistics do not allow for an exact comparison as the statistics for 1901 are estimated.

The migration of industries to large centres in Central and Western Ontario was not the only reason for the absolute decline of industries in the small towns. Spelt points out that changes in the environments³ in which these industries had grown was another factor in their decline. "The

¹J.M. Gilmour, op. cit., p. 141.

²It may be noted that figures for Ottawa are overestimated as the majority of establishments here were larger than the average size of establishments in the Region and in Canada.

³Jacob Spelt, op. cit., p. 172.

clearing of the land affected the water regime of the streams. The spring floods washed out the smaller dams, while in summer there was not a sufficient head of water to keep the mills running."¹ The small mills in general suffered from high costs as a result of repairing and maintaining the dams. Furthermore, local sources of raw materials, e.g., forests, which had been the main advantage of Eastern Ontario, were on the verge of exhaustion at the close of the nineteenth century.

Finally, whatever little concentration of industries Eastern Ontario had, it was not as intensive in Eastern Ontario as it was in Central Ontario in "the industrial belt."² The lack of concentration of industries was reflected in the lack of economies of scale.³

XI.4 Summary

Manufacturing in Eastern Ontario in the second half of the century continued to grow, though at a slower rate as compared with other regions of Southern Ontario, especially Central Ontario. Signs of slow manufacturing growth of the Region as a whole became clear after 1891. At the close of the century, manufacturing activity in several urban centres in Eastern Ontario had stagnated or declined, and in some cases the decline was absolute. The decline seemed partly due to the decay of small-scale and

¹Clearing the land for settlement by removing the forests had reduced the steadiness of snow melting and the runoff and flow of stream waters.

²J.M. Gilmour, op. cit., pp. 94-112.

³Economies of scale in the manufacturing sectors of Eastern Ontario, Central Ontario, Western Ontario and Southern Ontario as a whole were estimated for the year 1901. The regression results were not conclusive and were hard to interpret and hence are not reported here. The results showed that most of the manufacturing industries in Eastern Ontario exhibited decreasing or constant returns to scale, while most of the industries in Central and Western Ontario experienced increasing or constant returns to scale.

handicraft industries which served local markets and depended on local resources and water mills, and partly to changes in the reporting system of the 1901 Census. The natural advantages that manufacturing in the Region had enjoyed until the middle of the century declined in the second half of the century because of changes in technology, arrival of railroads, and the movement of the forest frontier to the West.

CHAPTER XII

The Government Sector 1851-1901XII.1 Historical Background

During this period, the centre of government activities shifted to Bytown. At the beginning of 1855, Bytown became a city under the name of Ottawa. Since 1844, the capital of the United Province of Canada had been shuffling between Toronto and Montreal and it was felt that a permanent site for the Capital must be decided on once and for all. At the end of 1857, Queen Victoria, on the advice of the Governor-General of Canada, chose Ottawa as the site for the Capital of the United Province.

Tenders for the construction of Parliamentary and departmental buildings were called for in 1859. McGreevy's tender of \$579,000 was accepted. Another \$48,310 was added to this to make these buildings fire-proof. Thus, the total spent on the construction of government buildings amounted to \$627,310.¹

The impact of this expenditure in the form of labour and material requirements must have been significant in a city with a population of 14,669 in 1861 and 21,545 in 1871.²

XII.2 Growth of the Government Sector

According to the Census of 1861, there were 300 civil servants in Ottawa and 25 in Kingston.³ The number of civil servants working in Ottawa

¹Province of Canada, Sessional Papers, Vol. 4, No. 57 (1860), p. 11.

²Census of the Canadas 1860-1861 and Census of Canada 1870-1871, op. cit.

³Calculated from the occupational distribution given in Census of the Canadas 1861, Vol. 1, op. cit., pp. 558-575. Census figures on civil employees for smaller centres are not available.

increased to 369 in 1871 (i.e., six years after the actual move of the Parliament of the United Provinces of Canada), and 690 in 1881, while the number of those working in Kingston rose from 78 in 1871 to 190 in 1881 (Table 12.1). Thus, after achieving the status of National Capital in 1867, Ottawa almost doubled its population of civil servants between 1871 and 1881. Confederation in 1867 and the addition of three more provinces in the 1870's (Manitoba in 1870, British Columbia in 1871, and Prince Edward Island in 1873) required an increase in the number of civil servants to administer the country, which was much larger than before. Also, the administration of the vast territory in the Northwest by the central government necessitated an expansion of the federal civil service at Ottawa.

Consequently, government employment in the Eastern Ontario Region increased from 758 in 1871 to 1371 in 1881, an increase of 81 per cent (Table 12.1). The corresponding increase recorded for the Province was 76 per cent.

Statistics on government employment are also available in Sessional Papers, but these statistics relate only to federal employment, and, in some cases, do not indicate the places where the employees were stationed. However, these figures give additional information on wages and salaries, which is not provided by censuses. For example, there were 344 full-time federal employees¹ (excluding military personnel) in 1867, earning \$367,400 in wages

¹This does not include members of Parliament and judges of the Supreme Court and other Provincial Courts.



TABLE 12.1

Government Employment,* Eastern Ontario,
By County or Census District, 1871, 1881

<u>Census District</u>	<u>1871</u>	<u>1881</u>
Addington	4	23
Brockville	25	32
Carleton	14	62
Cornwall	8	36
Dundas	14	25
Frontenac	10	20
Glengarry	13	14
Grenville	27	32
Hastings	47	81
Kingston, City	78	109
Leeds, South	25	39
Leeds and Grenville	8	18
Lennox	19	26
Lanark	25	41
Prescott	8	17
Prince Edward	27	30
Ottawa, City	369	690
Renfrew	13	28
Russell	16	35
Stormont	8	13
(1) Total, Eastern Ontario	758	1,371
(2) Total, Ontario	<u>2,157</u>	<u>3,812</u>
(1) as percentage of (2)	35.14	35.96
Growth Rate of (1) over 1871-1881	81.54	
Growth Rate of (2) over 1871-1881	76.72	

Sources: (1) Canada, Census of Canada, 1871, Vol. 2, op. cit., pp. 250-285 and Census of Canada 1881, Vol. 2, op. cit., pp. 278-315.

(2) Marvin, McInnis, Kingston in the Canadian Economy of the Late Nineteenth Century, Discussion Paper No. 132, (Kingston: Queen's University, No date given), Table A-III.

* Includes the employees of the federal, provincial and municipal governments, but excludes the employees of educational institutions and hospitals.

and salaries. The number increased to 407 in 1870, earning \$465,626 in wages and salaries.¹ It is not clear, however, how many of these employees were stationed in Ottawa or any other place in Eastern Ontario.

Census figures for the number of government employees in general are not available for the censal years 1891-1901. However, from various pieces of information in Sessional Papers, the figure for 1901 seems to be about 5,000. In general, government employment, especially federal employment, began to rise rapidly after 1867. With the exception of the postal department, most of the federal employees were concentrated in Ottawa.

XII.3 Summary

Government employment in the Region increased significantly in the second half of the century after Ottawa became the capital of the United Province and then of Canada. It increased by 81.54 per cent between 1871 and 1881 (i.e., the period for which census figures on government employment are available), compared with 76.72 per cent in Ontario as a whole. This increase in Eastern Ontario compared favourably with the 28.41 per cent increase in employment in manufacturing during the same period (Table 11.2). The impact of the rapid growth of the government sector in Eastern Ontario was, however, limited because this sector was still much smaller than other sectors of the Region. The multiplier effects of the construction of the Parliament buildings on the economy of Ottawa seemed to be quite significant, however.

1

Canada, Sessional Papers 1867-1868, Vol. V., No. 26, pp. 2-14.
Canada, Sessional Papers 1871, Vol. IV, No. 1, pp. 55-71.

CHAPTER XIII

Settlement, Population Growth, and Urbanization
1851-1901XIII.1 The Settlement Process

With the exception of the Pre-Cambrian Shield area of Eastern Ontario, settlement of the Region had almost ended by the middle of the nineteenth century. Arable land had already been taken up by the 1850's including even a few pockets of land in the Shield area that were suited for agriculture, but settlement of the Shield area continued in the second half of the nineteenth century. By 1880, the presently settled area of the Pre-Cambrian Shield had been occupied.¹ Physiography and the colonization roads were largely the two determining factors in the process of settlement.²

Settlement of the Pre-Cambrian Shield up to 1880 had followed lumbering. But after 1880, when the market (and part-time work) provided by lumber operations diminished and disappeared, some parts of the Shield were depopulated and abandoned.³

XIII.2 Population Growth

In 1851, about 283,000 people lived in Eastern Ontario. The figure had risen to 507,000 by the end of the century, an increase of 79 per cent

¹J.H.B. Richards, op. cit., p. 65.

²See Chapter VII.

³J.H.B. Richards, op. cit., p. 68.

over 1851 (Tables 7.1 and 13.2). This growth rate was far below the growth rates of the other regions of Southern Ontario. Central Ontario doubled and Western Ontario tripled their populations during the period 1851-1901.

The rate of population growth in Eastern Ontario during this period fluctuated (Table 13.1). Between 1851 and 1861, the Region experienced a population growth rate of 31.5 per cent; between 1861 and 1871 the growth rate was only 5.38 per cent, followed by 13.54 per cent between 1871 and 1881, 9.10 per cent between 1881 and 1891 and 4.52 per cent between 1891 and 1901. The rapid increase in population during 1851-1861 was attributable to the fast-moving process of settlement and migration of labour to the Ottawa Valley to participate in the exploitation of forest resources. The slow down of the population growth in Eastern Ontario in subsequent decades was mainly due to the fact that the settlement of the Region had almost ended by 1880 and also due to the rapid expansion of settlement of Western Ontario. Some settlers from Eastern Ontario seem to have moved to Western Ontario, but Western Ontario itself experienced a negative population growth between 1891 and 1901. Presumably by then settlers were moving to the new frontier of settlement of western Canada.

Broadly speaking, the Region's population grew quite rapidly up to 1861, but after that the rate of increase slowed down. The average compound rate of its population growth during the second half of the century as a whole was 1.17 per cent compared with 1.40 per cent for Central Ontario, 2.28 for Western Ontario and 1.61 per cent for all Southern Ontario (Table 13.1).

Within the Region, the counties of Carleton, Stormont, Russell and Renfrew were among those which experienced the highest growth rate. For example, between 1871 and 1901, the population of the County of Russell grew by

TABLE 13.1

Population of Eastern Ontario and Other
Regions of Southern Ontario, 1851-1901

Region	1851	1861	1871	1881	1891	1901		
Eastern Ontario	283,354	371,619	397,613	444,662	485,146	507,065		
Central Ontario	474,908	643,736	723,586	845,814	951,743	953,400		
Western Ontario	193,475	373,804	495,294	604,883	612,053	597,573		
Southern Ontario (Total)	951,697	1,389,159	1,610,493	1,895,353	2,047,942	2,059,038		
							Percentage Increases	
							Annual Compound Growth Rate 1851-1901	
	1851-1861	1861-1871	1871-1881	1881-1891	1891-1901	1851-1901		
Eastern Ontario	31.50	5.38	13.54	9.10	4.52	78.96	1.17	
Central Ontario	35.53	12.60	16.89	12.52	0.17	100.75	1.40	
Western Ontario	93.20	32.50	22.12	1.19	-2.36	208.86	2.28	
Southern Ontario (Total)	45.97	15.93	17.68	8.10	0.45	116.25	1.55	

Source: Calculated From Census of Canada Various Years.

TABLE 13.2

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Population in Eastern Ontario
1861-1901

	1861	1871	1881	1891	1901
Carleton	44,289	52,932	64,103	77,630	96,904
Dundas	18,777	18,777	20,598	20,132	19,757
Frontenac	41,190	39,720	42,384	47,009	44,534
Glengarry	21,187	20,524	22,221	22,447	22,131
Grenville	24,169	22,616	22,741	21,606	21,021
Hastings	44,970	48,364	55,061	59,084	59,291
Lanark	31,639	33,020	33,975	27,725	37,232
Leeds	35,750	35,302	38,434	39,279	37,975
Lennox	28,002	26,705	26,484	24,750	23,282
Prescott	15,499	17,647	22,857	24,173	27,035
Prince Edward	20,869	20,336	21,044	18,889	17,864
Renfrew	20,325	27,977	38,482	46,977	52,715
Russell	6,824	8,696	13,080	18,289	20,282
Stormont	18,129	18,987	23,198	27,156	27,042
Total Eastern Ontario	371,619	391,613	444,662	485,146	507,065
Percentage Change per Decade Ending with the Year at the Top of Column		5.38%	13.54%	9.10%	4.52%

Source: Canada, Dominion Bureau of Statistics, Seventh Census of Canada, 1931, Vol. 1 (Ottawa: Printer to King's Most Excellent Majesty, 1936), p. 349.

133.23 per cent, followed by that of the County of Renfrew with a growth rate of 88 per cent, Carleton with a rate of 83.72 per cent and Stormont with a rate of 42.42 per cent. The counties of Grenville, Lennox and Prince Edward experienced negative growth rates during the 1871-1901 period (Tables 13.2 and 13.3). Also in the whole period from 1851 to 1901, the counties of Renfrew, Russell and Carleton experienced the highest growth rates. Russell County, for example, experienced a growth rate of 606.68 per cent, Renfrew 460 per cent and Carleton 208.64 per cent.

Broadly speaking, the population in urban centres in Eastern Ontario and Central Ontario grew rapidly immediately before and after Confederation, which followed the general trend of the country's rising population. People had moved to urban centres hoping to get better jobs but later when their expectations did not materialize, the process of urbanization slowed down.

XIII.3 Growth of Urban Centres

Table 13.5 gives percentage growth rates of the main urban centres of Southern Ontario during the second half of the nineteenth century. Between 1871 and 1901, the highest population growth rate in Eastern Ontario was recorded by Cornwall (200 per cent), whereas Ottawa experienced a growth rate of 148.24 per cent. Kingston even underwent a negative population growth from 1861 to 1871 and 1891 to 1901. By 1901, Toronto occupied the highest position in the urban hierarchy of Southern Ontario due to an increase in population to 2 1/2 times its population in 1851.

In Chapter VII, it was established that urban centres in Eastern Ontario grew either as service centres, as administrative or military centres,

TABLE 13.3

Percentage Population Growth Rates in Eastern Ontario, By County

1851-1901

Counties of Eastern Ontario	1851-1861	1861-1871	1871-1881	1881-1891	1891-1901	1871-1901	1851-1901
Carleton	41.6	19.51	21.10	21.10	24.82	83.72	208.64
Dundas	35.96	0.0	9.69	-2.26	-1.86	5.21	43.05
Frontenac	33.31	-3.56	6.70	10.91	-5.26	12.12	44.38
Glengarry	20.41	-3.12	1.47	1.01	-1.40	7.82	25.77
Grenville	16.83	-6.42	00.55	-7.56	-2.70	-7.05	1.51
Hastings	40.63	7.54	13.84	7.30	00.35	22.54	85.41
Lanark	15.82	4.36	2.89	11.03	-1.30	12.75	-00.22
Leeds	18.06	-1.25	8.87	2.19	-3.31	7.57	25.41
Lennox & Addington	21.12	-4.63	-0.50	-6.55	-5.63	-18.14	-
Prescott	47.79	13.85	29.52	5.75	11.84	53.19	157.84
Prince Edward	10.69	-2.55	3.48	-10.24	-5.42	-12.15	-5.36
Renfrew	115.88	37.59	37.54	22.70	12.21	88.42	459.90
Russell	237.70	27.43	50.41	39.82	10.89	133.23	606.68
Stormont	23.81	4.73	22.17	17.06	-0.42	42.42	84.77

Source: Calculated from Canada, Dominion Bureau of Statistics, Seventh Census of Canada, 1931, Vol. 1
(Ottawa: Printer to King's Most Excellent Majesty, 1936), p. 349.

TABLE 13.4

Population of Urban Centres, Southern Ontario*

	<u>1861-1901*</u> (with population more than 5,000)				
	1861	1871	1881	1891	1901
Toronto	44,821	59,000	96,196	181,215	209,892
Hamilton	19,096	26,880	36,661	48,959	52,634
Ottawa	14,669	24,141	31,307	44,154	59,928
London	11,555	18,000	19,746	31,937	37,947
Kingston	13,743	12,407	14,091	19,263	17,961
Brantford	6,251	8,107	9,890	12,753	26,619
St. Catharines	6,284	7,864	9,616	9,170	9,946
Belleville	6,277	7,305	9,516	9,916	9,117
Guelph	5,076	6,878	9,890	10,537	11,496
Brockville	4,112	5,102	7,690	8,791	8,940
Cornwall	—	2,233	4,468	6,805	6,704

Sources: (1) Canada, Board of Registration and Statistics, Census of the Canadas 1860-1861, op. cit., pp. 128-129.

(2) Canada, Dominion Bureau of Statistics, Seventh Census of Canada, 1931, Vol. 3 (Ottawa: Printer to King's Most Excellent Majesty, 1933), pp. 8-17.

* Figures for 1871 and onwards are on the basis of geographic areas as defined by the Census of 1931.

TABLE 13.5

Population Growth Rates, Urban Centres*

	1861-1871	1871-1881	1881-1891	1891-1901	1871-1901
Toronto	31.61	63.44	88.38	15.82	255.75
Hamilton	40.76	36.29	33.54	7.50	95.82
Ottawa	64.57	29.68	41.03	35.73	148.24
London	55.77	9.70	61.73	18.81	110.82
Kingston	-9.74	13.57	36.70	-6.75	44.76
Brantford	29.69	22.00	29.02	108.9	228.34
St. Catharines	25.14	22.27	4.64	-8.05	26.47
Belleville	16.37	30.26	4.20	8.76	24.80
Guelph	35.50	43.66	6.54	9.10	67.14
Brockville	24.07	50.72	14.30	1.69	75.22
Cornwall	—	100.00	52.30	-1.48	200.22

Sources: (1) Canada, Board of Registration and Statistics, Census of the Canadas 1860-1861, op. cit., pp. 128-129.

(2) Canada, Dominion Bureau of Statistics, Seventh Census of Canada, 1931, Vol. 3 (Ottawa: Printer to King's Most Excellent Majesty, 1933), pp. 8-17.

* Figures from 1871 and onwards are on the basis of geographic areas as defined by the Census of 1931.

or as points of transshipment, as in the case of Kingston, or as timber towns like Bytown. Though Kingston was hard hit by the reduction in its port functions after the completion of the St. Lawrence Canals in 1848, and their improvement by 1900, by the opening of the railways after 1854, and by the departure of the military in 1870,¹ this type of urban growth pattern continued even in the second half of the nineteenth century. Kingston in 1882 was still predominantly a service centre though it was on the decline. Table 13.6 indicates that in 1881 (the last year in the nineteenth century for which occupational distribution in urban centres is available) about 45 per cent of the working people belonged to the service class. In the case of Ottawa, the figure was even higher, i.e., 49 per cent. Even in Toronto, the service class was approximately of the same size as the industrial class. Hamilton was the only city in Southern Ontario where the percentage of working people engaged in the industrial sector far exceeded those engaged in the commercial and other service sectors.

In practically all cases of urban growth or decline, the services sector was a decisive factor. This service function was dependent to a great extent on transportation facilities. To expand, a central place required good connections with a prosperous hinterland. Before 1851, water transportation served as a means of connection between a centre and its hinterland; after 1851 waterways were supplemented by railways. In 1851, the larger urban centres were ports and transshipment points like Kingston and Toronto. Thirty years later, they were closely related to the railway network (Toronto and Hamilton). Because most of the urban centres in the Region did not become

¹B.S. Osborne, "Kingston in the Nineteenth Century: A Study in Urban Decline," in David J. Wood, editor, op. cit., p. 155.

TABLE 13.6

Percentage Distribution of Occupational Structure
in Main Cities in 1881

	<u>Toronto</u>	<u>Kingston</u>	<u>Ottawa</u>	<u>Hamilton</u>
Agricultural Class	1.71	1.35	.80	1.29
Commercial Class	20.83	22.12	17.67	17.75
Domestic Class	13.07	12.00	15.06	11.31
Professional Class	6.80	11.26	16.63	5.33
Total Services Class	40.70	45.38	49.36	34.39
Industrial Class	42.96	37.24	33.20	49.11
Unclassified	14.63	16.03	16.64	15.21
Total	100.00	100.00	100.00	100.00

Source: Calculated from Canada, Department of Agriculture, Census of Canada, 1881, Vol. III (Ottawa: 1883), pp. 279, 291, 302, 315.

centres of railway networks and lost their importance as service centres, they experienced a decline in population growth rates. Slow growth of small-scale and local manufacturing establishments and in some cases an absolute decline, was also another factor in the decline of urban centres, especially the small ones. The towns of Napanee and Almonte were among those to experience an absolute decline in the levels of manufacturing output, employment and in the number of firms.

XIII.4 Urbanization in Eastern Ontario

In the middle of the nineteenth century, Eastern Ontario was still rural in nature. In 1851, out of a total population of 283,354 about 88 per cent of the people were living in rural areas, and only 12 per cent in urban centres¹ (Tables 13.7 and 13.8).

Even in 1901, 62 per cent of the Region's total population was still living in rural areas, as compared to 57 per cent in Ontario as a whole. Thus, Eastern Ontario was still a little less urbanized than other parts of Ontario. However, its percentage of urban population in 1901 was slightly larger than the national urban percentage (Table 13.8).

Within the Region itself, the County of Carleton was highly urbanized, with 67 per cent of its inhabitants living in urban centres as compared with only 27 per cent in 1851. About 60,000 or 83 per cent of the total urban population of the Region was living in Ottawa alone. On the other hand, the counties of Lennox and Addington, Glengarry, Renfrew and Russell were least urbanized. Table 13.7 indicates that these counties were without any urban

¹Urban centres were defined (for the period 1871-1941) as incorporated places, regardless of size. For a definition of urban places after 1941, see Chapter XX.

TABLE 13.7

Population Rural & Urban, Eastern Ontario
by Counties or Census Divisions 1851-1901

Counties	1851		1861		1871		1881		1891		1901	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Lennox & Addington	23120	-	26229	1773	23309	4396	21424	5060	20139	4611	19182	4164
Carleton	23203	8194	29104	15185	30304	22628	35257	28846	32288	45342	32209	64693
Dundas	13811	-	17304	1473	16840	1937	17878	2720	15489	4643	14934	4823
Frontenac	19150	11697	25855	15235	24849	14871	26064	16320	25360	21649	24504	20030
Glengarry	17596	-	21187	-	20524	-	22221	-	20133	2314	18888	3243
Grenville	18551	2156	19624	4567	18204	4412	17735	5009	15433	6176	14077	6944
Hastings	27408	4569	36542	8428	38484	9880	40564	14497	39483	19601	38299	20942
Lanark	25401	1916	28037	3602	25470	7550	24010	9945	22363	15362	20428	16804
Leeds	27044	3236	31638	4112	28180	7122	27536	10898	25453	13826	24124	13851
Prescott	10487	-	14240	1259	15976	1671	20084	20773	21129	3044	20185	6850
Prince Edward	17318	1569	18802	2067	17458	2878	17457	3593	15047	3842	13514	4350
Renfrew	9415	-	18318	2007	23890	4087	31910	5673	35914	11063	38413	14302
Russell	2870	-	6824	-	8696	-	13080	-	16824	1465	17577	2705
Stormont	12997	1646	16214	1915	16954	2033	18730	4468	20351	6805	20338	6704
Total E. Ont.	248371	34983	309918	61613	308138	88465	333950	110706	325396	159743	316672	190407
Total Ontario	818541	133463	1137899	258192	1264854	355997	1351074	575848	1295323	818998	1246969	935978
Canada	2118218	318079	2702413	527229	2966914	722543	3215303	1109507	3296141	1537098	335703	2014222

Source: Canada, Dominion Bureau of Statistics, Seventh Census of Canada, 1931, (Ottawa: Printer to King's Most Excellent Majesty, 1933), Vol. 1, Table V, p. 366.

TABLE 13.8

Percentage Distribution of Rural & Urban Population
of Eastern Ontario by Counties or Census Divisions, 1851-1901

Characteristics and Year	1851		1861		1871		1881		1891		1901	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Counties or Census Divisions												
Lennox & Addington	100	-	93	7	83	17	80	20	81	19	82	18
Carleton	73	27	65	35	57	43	44	56	58	42	33	67
Dundas	100	-	92	8	89	11	86	14	76	24	75	25
Frontenac	62	38	62	38	62	38	61	39	53	47	55	45
Glengarry	100	-	100	-	100	-	100	-	89	11	85	15
Grenville	89	11	81	19	80	20	79	21	71	29	66	34
Hastings	85	15	81	19	79	21	73	27	66	34	64	36
Lanark	92	8	88	12	77	23	70	30	64	36	63	37
Leeds	89	11	88	12	79	21	71	29	64	36	63	37
Prescott	100	-	91	9	90	10	87	13	87	13	74	26
Prince Ed.	91	9	90	10	85	15	82	18	79	21	75	25
Renfrew	100	-	90	10	85	15	82	18	76	24	72	28
Russell	100	-	100	-	100	-	100	-	91	9	86	14
Stormont	88	12	89	11	89	11	80	20	74	26	75	25
T. Eastern Ont.	88	12	83	17	79	21	75	25	67	33	62	38
Ontario	85	15	81	19	78	22	69	31	61	39	57	43
Canada	87	13	84	16	81	19	75	25	69	31	63	37

Source: Calculated from Table 13.7.

population in 1851. As late as 1881, there was still no urban population recorded for Russell and Glengarry Counties.

XIII.4.1 Process of Urbanization

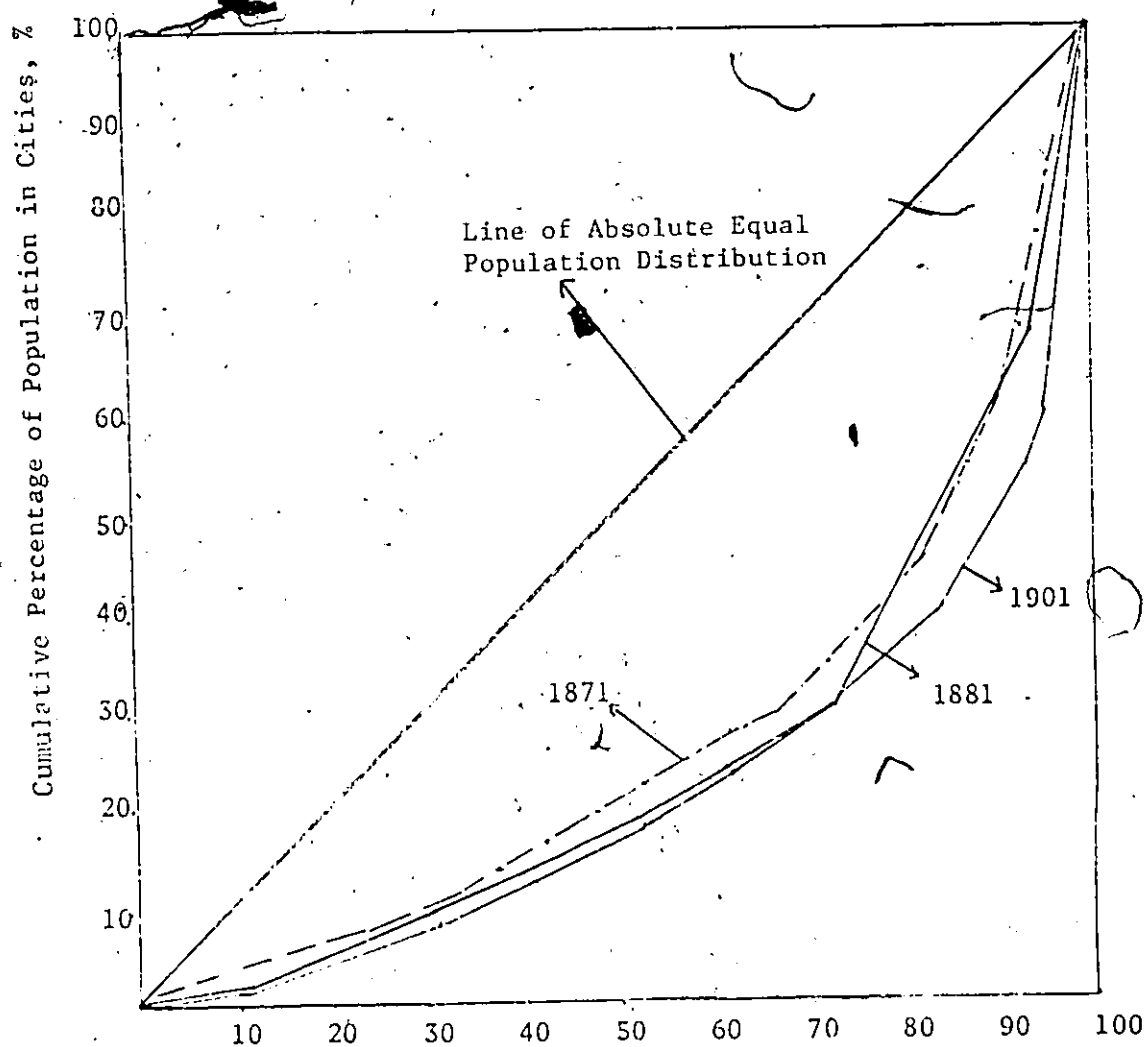
The level of urbanization (i.e., $\frac{U}{P} = \frac{\text{Urban Population}}{\text{Total Population}} \times 100$) does not fully describe the process and rates of urbanization. Urbanization may result from an increased concentration of urban population within existing cities or through the development of new urban centres.¹ The first case involves rural migration to cities and the second case involves the transformation of existing non-urban areas into urban areas resulting from population growth. To shed light on the process of urbanization, a Lorenz Curve has been fitted for three years, 1871, 1881, and 1901. The horizontal axis measures the cumulative percentage of the total number of cities, and the vertical axis the cumulative percentage of total urban population. The size distribution of cities moves from the very small to the very large city. In 1871, the largest 10 per cent of the urban centres had 35 per cent of the total urban population of the Region; in 1881 their share was 36 per cent, which had increased to 51 per cent by 1901. Thus, at the close of the nineteenth century, urban concentration had taken place in the large cities of Eastern Ontario, the biggest being Ottawa which contained about 32 per cent of the total urban population of the Region. Hence, Ottawa might be considered as a "centre of attraction" in the Region during the period 1871-1901. But it is not known what percentage of addition to the population of Ottawa came from the rest of the Region.

Alternatively, the uneven distribution of population can also be noticed from the Gini coefficients prepared for the census years, 1871, 1881, 1891 and 1901. The Gini Coefficient, based on 21 centres of the Region, declined slightly from .53 in 1871 to .52 in 1881, and then moved up to .54 in 1891 and .57 in 1901.

¹See J.G. Williamson and J.A. Swanson, "The Growth of Cities in the American Northeast 1820-1870", Explorations in Entrepreneurial History, Second Series, Vol. 4 (1966-1967), Supplement, pp. 3-101

Graph 4.1

Lorenz Curves for Population Size Distribution,
Eastern Ontario. 1871-1901



Cumulative Percentage of Number of Cities in Eastern Ontario, %

Source: Calculations Based on Various Censuses.

XIII.4.2 Rates of Urbanization

Up to this point, the phenomenon of urbanization has been characterized in terms of levels rather than of rates. Level of urbanization simply means the proportion of total population that is concentrated in urban centres or settlements. In other words, level of urbanization is a ratio of urban population to total population at any time (U/p). The rate of urbanization means the speed at which this ratio is increasing or decreasing $\Delta(U/p)$. Thus, the rate of urbanization is a function of two components, viz., urban population and total population, and may be a highly ambiguous measure of the growth of cities and urbanization per se.¹ While $\Delta(U/p)$ is the most commonly used measure of urbanization, another measure $\frac{\Delta U}{\Delta P/p}$ may be more useful to indicate socio-economic change in an underdeveloped or pre-industrial population, where all incremental urbanization results from a low U/p base of a predominantly agrarian order.² This was the situation in Eastern Ontario before 1901.

However, these rates of urbanization may be blurred by migration gains or losses. Therefore, these two measures of rates of urbanization may not provide a precise measurement of structural changes. To overcome this problem, another measure ($\Delta U/U$) of the rate of growth of urban population itself is suggested. This rate is independent of the total size of population. It is the least ambiguous of all the measures of urbanization. These three rates of urbanization have been calculated for the five decennial periods beginning with 1851 (Table 13.9). For the purpose of comparison, all these rates are given in percentages.

¹ E. Eric Lampard, "The Evolving System of Cities in the United States: Urbanization and Economic Development," Printed in Harvey S. Perloff et al., Issues in Urban Economics, Resources for the Future (Baltimore: The Johns Hopkins Press, 1969), pp. 81-139.

² Jeffery Williamson, "Ante-Bellum Urbanization in American Northeast", Journal of Economic History, Vol. 25 (1965), pp. 592-606.

As it is clear from that Table that the "trio" move in the same direction, the rising or falling rates of urban population, $\frac{\Delta U}{U}$, are accompanied by rising or falling rates of shift of rural to urban population (U/p) of population in the Region. However, the rates of growth of urban population slowed down after 1861, and, with the exception of 1881-1891, continued to decline up to the end of the nineteenth century. The rate of rural-urban shift remains quite consistent (i.e. between 4 to 5 per cent) with the exception of one decade, 1881-1891, when it jumped to 8 per cent). The marginal rate of urbanization $\frac{\Delta U/U}{P}$ also moved in the same direction as $\Delta U/U$ and $\Delta(U/p)$ but with varying degrees of growth. For example, the marginal urbanization growth rate during the decade 1851-1861 was 2.42 per cent and during the next decade it jumped to 8.10 per cent. This sudden jump was due to a greater decline in the population growth rate vis-à-vis urban growth rate. The higher than usual marginal urbanization growth rate indicates that urbanization in the Region was in large part due to a rural-urban shift.

XIII.4.3 Urbanization and Economic Growth

In the absence of figures for per capita income (Y/P), figures for growth rates in per worker value added have been used as a proxy variable to correlate changes in the level of urbanization $\Delta(U/p)$ and the economic growth rate. Tables 13.9 and 11.3 (Chapter XI), indicate that urbanization and the economic growth rates of the Region moved together between 1871 and 1901. During this period, the decade of highest rate of rural-urban shift $\Delta(U/p)$ corresponds to the decade of highest growth rate in value added per worker, viz., the decade of 1881-1891. However, it is difficult to say "what" led to "which", i.e. whether urbanization was responsible for higher value added per worker or vice versa.

TABLE 13.9
Various Measures of Urbanization - Eastern Ontario
1851 - 1901

Measure of Urbanization	1851	1861	1871	1881	1891	1901
$(U/P) \times 100$	12	17	21	25	33	38
	1851-61	1861-71	1871-81	1881-91	1891-1901	
$\Delta(U/P) \times 100$	5	4	4	8	5	
$(\Delta U/U) \times 100$	76.12	43.58	25.14	44.29	19.20	
$\frac{\Delta U/U}{\Delta P/P} \times 100$	2.45	8.10	1.85	4.86	4.24	

Source: Calculated from Seventh Census of Canada, 1931, op. cit., Vol. 1, p. 357.

XIII.5 Summary

At the beginning of the second half of the nineteenth century, most of the presently settled area of Eastern Ontario had already been occupied. In the second half of the century, only a part of the Pre-Cambrian Shield which was rich in forest resources was settled. Later in the 1880's, when the timber trade had almost disappeared and the agricultural frontier had moved to the West, the settlement process of the Region was complete. Consequently, the population growth of the Region also slowed down especially after 1881. The slow growth in population was, however, accompanied by a rapid shift from rural areas toward urban areas. This shift seems to have been caused, among other factors, by the slowdown of some of the small-scale and handicraft industries, such as carding and fulling, tanneries, breweries, boots and shoes, woollen clothing, and agricultural implements. Rural workers moved to cities to search for jobs.

XIII.6 Concluding Remarks, Period II

External demand for forestry resources continued to dominate the growth scene of the Region, but with one difference. Exports of square timber to the U.K. declined and those of sawn lumber to the U.S.A. rose phenomally. The decline in white pine exports was more than offset by an increase in the exports of agricultural products and of sawn lumber to the U.S.A. With a rise in American demand for agricultural products, agriculture of the Region was diversified. Despite this, the value of agricultural exports was smaller than that of forestry exports.

Changes in technology, movement of settlement frontier to the West, the rise of Toronto as a financial and industrial centre, and the arrival of railroads were among other factors that changed the structure of Eastern Ontario's economy and stripped it of its natural advantages over other regions of Southern Ontario. Consequently, the Region began to experience slow growth.

PERIOD III

CHAPTER XIV

Transportation in the Twentieth CenturyXIV.1 General

If transportation in the second half of the nineteenth century was characterized by railway building, that of the twentieth century, especially the first half, was characterized by the development of roads and airways. Areas that had been inaccessible to waterways and had not been served by railways were now made accessible by the construction of roads and airfields. Towards the end of the nineteenth century, a self-propelled vehicle using internal combustion engine, was being developed. This discovery did for roads in the present century what the steam engine had done for railways in the latter half of the nineteenth century.

XIV.2 Railways

Although Canada as a whole witnessed the expansion of railways because of the westward movement of the frontier, Eastern Ontario did not see much expansion of railways in the twentieth century. In the first 14 years of the century, however, two transcontinental railways (i.e., the Grand Trunk Pacific and the Canadian Northern) were built, following the lead of the Canadian Pacific. The main line of the Grand Trunk Pacific did not traverse the Region, but the main line of the Canadian Northern did. A branch line of the Canadian Northern was laid from Toronto to Napanee and from there to Ottawa via the tracks of the recently acquired Bay of Quinte Railway.¹

¹ Jacob ~~elt~~, op. cit., p. 159.

Thus, the building of two transcontinental railway lines did not have much impact on the economy of Eastern Ontario. There has been no addition to railway mileage in Eastern Ontario for the last several decades; instead three branch railway lines were abandoned between 1945 and 1965.¹

XIV.3 Roads and the Internal Combustion Engine

With the invention of the internal combustion engine at the close of the nineteenth century and the development of the automobile, macadamized roads were needed, which, until then, had been virtually non-existent. The first step toward the improvement of roads in Ontario was the passing of the Highway Improvement Act in 1901, which provided a subsidy of \$1 million to improve road conditions.² Later, in 1917, a highway department was established in Ontario to build roads and highways. Road building in the Region received further impetus in 1931 when the federal government itself entered directly into the construction of the TransCanada Highway (i.e., Highway 17 as it is called in Ontario). This highway passes through Eastern Ontario and links most of its urban centres located along the Ottawa River, viz., Hawkesbury, Ottawa and Pembroke. Later, several other highways and roads were built, notably Highway 401, commonly known as the Quebec-Montreal-Toronto-Windsor axis. This highway passes through or provides easy access to the major urban centres of Eastern Ontario located along the St. Lawrence River, viz., Cornwall, Brockville, Kingston, Trenton, and Belleville.

¹They were: Ottawa-Cornwall, Pembroke-Golden Lake and Rideau Lake-Brockville lines, in W.G. Dean, (editor), Economic Atlas of Ontario (Toronto: University of Toronto Press, 1969), p.94.

²G.P. deT. Glazebrook, op. cit., Vol. 2, p. 247.

Highway 417, which runs parallel to the old Highway 17, has recently been built to improve Ottawa's link with Montreal. As a result of this new four-lane highway, the time necessary to travel between Ottawa and Montreal has been reduced considerably. Other highways that link the various urban centres in the Region are: Highway 7 (Central Ontario route, linking Ottawa, Carleton Place and Perth, with Peterborough and other centres in Central Ontario); Highway 16 (connecting Ottawa with Prescott with further connection to Kingston via 401); Highway 41 (linking Pembroke and Napanee, called North-South route); Highway 15 (connecting Ottawa with Kingston); and Highway 29 (linking Arnprior with Brockville, via Smiths Falls).

In 1958, there were more than 12,800 miles of roads and highways in Eastern Ontario. The current total is approximately 15,000 miles. Nearly 219,000 motor vehicles or 11 per cent of the provincial total were registered in Eastern Ontario in 1958.¹ More than four-fifths of them were classified as passenger vehicles (including dual-purpose vehicles) and the remaining one-fifth were trucks. The percentage of trucks in the total number of vehicles was less in Eastern Ontario than in Ontario as a whole. This reflects the already-noticed fact that Eastern Ontario is less industrialized and less commercialized than Ontario as a whole, and, thus, needs fewer trucks to transport manufactured products or raw materials. In 1973, 459,876 vehicles were registered in the Region, which is an increase of 240,876 over the figure for 1958.² The County of Carleton (which includes the Ottawa area) accounted

¹ Ontario, Ontario Department of Economics, Eastern Ontario, Economic Survey (Toronto: Economic Development Branch, 1960), pp. 44-45.

² Ontario, Ministry of Economics, Treasury and Intergovernmental Affairs, Ontario Statistics, Vol. 2, Economic Series (Toronto: Ontario Statistical Centre, 1976), pp. 727-729.

for almost half of all the Region's vehicles.¹

XIV.4 Air Transport

The internal combustion engine has brought about a revolutionary change in transportation not only through the automobile and truck but also through the development of air travel. In the beginning, air transportation in Canada as a whole was seen as a complement to and not as a competitor with railways, roads, and ships. Air transportation was designed to make accessible those areas which could not be approached by surface transportation.

Though roads are the most common means of transportation within the Region, air transportation is gradually becoming popular as a link to outside centres. Currently, there are four commercial airports in the Region, viz., at Ottawa, Kingston, Pembroke, and Brockville. Ottawa has by far the largest commercial airport in the Region. It ranks sixth among all Canadian airports in terms of domestic journeys both inbound and outbound. In 1978, it handled 1,258,000 passengers out of a total of 20,530,900 passengers handled by all Canadian airports for domestic journeys.² As an international airport, it handles regular flights to cities in the U.S.A. and chartered flights to cities in the U.K. In 1978, about 58,000 passengers used Ottawa airport for their journeys to or from cities in the U.S.A. Of these 25,540 (44 per cent) were going to or coming from Washington/Baltimore and 15,970 (28 per cent) were going.

¹ The larger number of vehicles in the Ottawa area may reflect the high living standard of its people. Ottawa, being the national capital, provides job opportunities for both husbands and wives. The average family income is higher, therefore, than that in other parts of the Region.

² Canada, Statistics Canada, Air Passenger Origin and Destination, Domestic Report 1978 (Annual), Cat. No. 51-204, (Ottawa: 1979), p. 4.

to or coming from Tampa/St. Petersburg, Florida.¹ From these figures it is clear that a large part of passenger air traffic between Ottawa and U.S. cities is between the two capital cities (Ottawa and Washington). This passenger traffic is apparently largely accounted for by trips of federal government officials. Thus, both international and domestic traffic to and from Ottawa reflects the importance of the government sector in Eastern Ontario.

The remaining three commercial airports of the Region, Kingston, Pembroke and Brockville, are not important in terms of the number of air passengers. In 1978, Kingston and Pembroke airports handled 100 and 600 passengers, respectively.²

Currently, five major airlines operate from Ottawa, viz., Air Canada, Canadian Pacific, Nordair, Eastern Airlines and the Great Lakes Airline.³

¹Canada, Statistics Canada, Air Passenger Origin and Destination, Canada-United States Report, 1978, Cat. No. 51-203 (Annual), (Ottawa: 1979), p. 302. Recently, Pilgrim Airline of New England has started direct flights from Ottawa to New York.

²Canada, Statistics Canada, Air Passenger Origin and Destination Report 1978, op. cit., p. 302. Figures are not available for Brockville as commercial flights from it began in 1980 only.

³Apart from these, three small airlines, First Air, Toronto Air, and Air Atonabee, fly between Ottawa and Montreal, Brockville and Toronto, and Ottawa and Peterborough via Kingston, respectively.

XIV.5 Water Transportation - Opening of the St. Lawrence Seaway, 1959

The efforts to deepen waterways that began in the second half of the last century, continued in the present century. These efforts finally succeeded in the reconstruction of the Welland Canal in 1932 and the opening of the St. Lawrence Seaway in 1959. The reconstruction of the Welland Canal involved deepening the locks to 30 ft., widening them to 80 ft., lengthening them to 859 ft., and reducing their number from 26 to 8. As a result, the largest vessels could pass from the Upper Great Lakes to Lake Ontario, but they still could not go to Montreal. The redevelopment of the Welland Canal overcame the obstacle of the Niagara escarpment and increased the flow of traffic on Lake Ontario and the St. Lawrence River, but it did not eliminate the need for transshipment of cargo at Kingston or Prescott. The construction of the St. Lawrence Seaway in 1959 eliminated this need because lakers could now go down to tidewater and oceangoing ships could sail to the head of lakes.

Construction of the St. Lawrence Waterway project began in 1954 and the Seaway was opened for navigation in 1959. Work on the project extended throughout the 190 miles from Montreal to Lake Ontario, 90 miles of which lie in Eastern Ontario. It involved the construction of: a new navigable through-route between Montreal and Lake St. Louis, additional locks at St. Lambert and Beauharnois, two hydroelectric projects - one owned by Ontario Hydro and the other by the State of New York, and one power canal. The project also involved the cooperation and participation of four governments - those of Canada, the United States, Ontario, and New York. The project as a whole cost about one billion dollars, and forced the relocation of 6,500

people and 525 houses. The entire village of Iroquois was moved further north and the town of Morrisburg lost its water-front.¹

XIV.6 Impact of the Opening of the St. Lawrence Seaway on Eastern Ontario

The Seaway has been open for navigation for 21 years - a period long enough to allow an assessment of its impact on the economy of Eastern Ontario.

It is generally accepted that Canada as a whole has benefitted greatly from the construction of the Seaway. At the peak of its construction, the St. Lawrence project employed 22,000 workers. The wages and salaries of those employed must have created millions of dollars of increased demand through multiplier effects. The purchase of construction and other materials must also have created direct, indirect and induced income effects in the various parts of the country. It is, however, not clear how far the income and employment effects were felt by Eastern Ontario or how far they leaked away elsewhere.

Perhaps the best way to determine the impact of the Seaway on Eastern Ontario would be to look at the traffic statistics for Eastern Ontario ports before and after the opening of the Seaway (assuming that the traffic was affected by no other factors except the opening of the Seaway). While traffic on the Montreal-Great Lakes portion of the Seaway increased dramatically after its opening (See Table 14.1), traffic through Eastern Ontario ports declined (See Table 14.2). In 1958, the total cargo (international and coastal combined) handled by all Eastern Ontario ports (all except Belleville and Trenton located directly on the St. Lawrence) was 7,095,000 tons. About 89 per cent of this shipping was coastal (internal). Table 14.2 indicates another interesting point, i.e., a high proportion of all cargo was unloaded in all years. This may imply that the Region's imports exceeded its exports. But a part of the unloaded cargo may have been destined for further reloading to destinations outside the Region.

¹The Citizen, Ottawa (July 7, 1979), p.23.

TABLE 14.1

Traffic on the Seaway, by Major Commodity Group, 1958-76
(thousand short tons)

Commodity	Seaway Section	1958	1959	1960	1961	1965	1970	1971	1972	1973	1974	1975	1976
Agricultural products	W.C. M-LO	6,653 4,868	8,637 7,375	9,711 8,220	12,131 10,674	18,477 17,634	21,152 19,799	23,805 22,589	24,431 23,517	25,523 24,331	17,518 16,173	22,909 21,430	21,671 20,674
Iron ore	W.C. M-LO	4,291 1,526	6,915 6,187	7,856 4,315	6,672 4,017	16,134 12,774	16,091 15,119	13,567 13,427	13,732 12,533	17,183 16,692	14,914 14,291	16,469 14,506	21,550 20,535
Coal and coke	W.C. M-LO	4,460 1,071	4,896 1,183	4,500 1,111	4,515 1,324	7,389 1,227	11,174 824	9,743 852	10,511 864	8,791 1,093	6,975 1,505	9,374 1,357	9,359 2,167
Petroleum and petroleum products *	W.C. M-LO	1,921 1,009	1,444 1,692	1,431 1,880	1,526 1,542	1,632 2,565	1,871 3,985	1,584 3,041	1,795 3,935	2,631 5,061	1,818 3,704	1,535 2,651	1,282 2,148
Manufactured iron and steel	W.C. M-LO	301 196	734 629	1,232 1,448	1,966 2,163	3,219 3,721	5,331 5,725	6,351 6,602	5,851 6,343	5,059 5,450	3,416 3,741	2,342 2,601	3,531 3,809
Other	W.C. M-LO	3,648 3,092	4,911 3,527	4,520 3,336	4,645 3,698	6,569 5,462	7,344 5,719	7,859 6,437	7,874 6,465	8,008 6,007	7,659 4,732	7,220 5,465	6,947 5,064
All Commodities	W.C. M-LO	21,274 11,762	27,537 20,593	29,250 20,310	31,455 23,418	53,420 43,383	62,963 51,171	62,909 52,948	64,194 53,657	67,195 57,634	52,360 44,146	59,849 48,010	64,340 54,397

* Including fuel oil.

Source: The St. Lawrence Seaway Authority, Economics and Planning Branch, Economics Section.

W.C. = Welland Canal Section of the Seaway

M-LO = Montreal-Lake Ontario Section of the Seaway

TABLE 14.2

Cargo Handled (Loaded and Unloaded) at Ports, Eastern Ontario Region,
For Selected Years

Ports	1958		Unloaded as % of Total	1959		Unloaded as % of Total		
	International	Coastal		International	Coastal			
(Thousands of tons)								
Belleville	64.50	287.60	352.10	84.18	37.68	275.25	312.93	55.01
Brockville	161.50	61.50	163.10	89.00	41.02	61.81	102.83	91.86
Cardinal	21.05	2.88	23.93	100.00	-	-	-	-
Cornwall	98.08	154.16	252.96	99.34	57.07	133.26	190.33	99.95
Gananoque	1.73	0.80	2.53	100.00	2.02	-	2.02	100.00
Kingston	130.33	1747.00	1877.33	57.57	269.37	1450.06	1719.43	58.66
Morrisburg	-	9.96	9.96	100.00	-	95.98	95.98	100.00
Napanee	20.65	-	20.65	100.00	12.02	0.24	12.26	100.00
Prescott	291.10	3149.40	3440.50	57.86	164.36	1355.60	1519.96	63.00
Pictou	735.69	183.26	918.95	21.19	509.33	412.11	921.34	12.89
Trenton	33.82	-	33.82	100.00	29.18	0.04	29.22	100.00
Eastern Ont. (Total)	1498.55	5596.56	7095.11	56.6	1122.05	3784.35	4906.4	51.6
Ont. (Total)	22410.14	30849.33	53259.47	58.13	25823.18	29562.86	55385.98	56.80
1971								
Belleville	-	187.85	187.85	14.36	-	-	-	-
Brockville	-	-	-	-	-	-	-	-
Cardinal	1.32	103.40	104.72	100.00	102.47	114.0	216.47	100.00
Cornwall	11.31	31.03	42.34	23.72	26.18	51.60	77.78	21.9
Gananoque	-	-	-	-	-	-	-	-
Kingston	14.02	429.76	443.78	90.00	5.91	480.13	486.04	88.25
Morrisburg	-	89.76	89.76	100.00	-	101.45	101.45	100.00
Napanee	-	-	-	-	-	-	-	-
Prescott	24.60	480.30	504.90	82.34	65.90	409.29	475.19	74.66
Pictou	906.47	302.98	1209.45	74.02	707.40	347.90	1655.30	73.80
Trenton	7.24	-	7.42	100.00	-	-	-	-
Eastern Ont. (Total)	953.64	1625.08	2778.72	53.03	907.86	1504.37	2412.23	54.00
Ont. (Total)	32622.86	43044.86	75667.72	54.48	37051	43510	80561	55.69

Sources: Canada, Statistics Canada, Shipping Report, Part II International Seaborne Shipping (by Port), Part III
Coastwise Shipping, Cat. Nos. 54-203, 54-204 (Annual) (Ottawa: Information Canada, various years).

Immediately after the opening of the Seaway in 1959, signs of declining traffic at the major ports of Eastern Ontario became apparent. Prescott, the biggest port of the Region in 1958, suffered a serious decline when cargo dwindled from 3,440,500 tons in 1958 to 1,519,960 in 1959, the biggest decline being in coastal shipping. This occurred because of a fall in the transshipment of cargo from lakers to canalliers at Prescott, which was no longer required with the completion of the Seaway. The port of Kingston also registered a decline in the volume of cargo handled. The port of Picton, however, witnessed an increase in cargo handled, due to iron ore shipments to Hamilton from the Belleville area, including Madoc and Marmora (See Table 14.3). The total cargo handled by all ports of Eastern Ontario declined from 7,095,110 tons in 1958 to 4,906,400 tons in 1959, a drop of 30.85 per cent (Table 14.2). In contrast, the traffic at Quebec ports registered a rapid increase. As lakers can now carry grain all the way to ports on the St. Lawrence for direct transfer to oceangoing vessels, it became advantageous for the U.S. grain traffic to move to Quebec ports, and then return laden with ore from the Quebec-Laborador ore deposits for delivery to American markets.

In 1971, twelve years after the opening of the Seaway, Eastern Ontario ports handled only 39 per cent of the traffic they used to handle in 1958, a decline of 61 per cent, while cargoes handled by all the ports of Ontario increased by 42 per cent between 1958 and 1971. The proportion of all Canadian cargo handled by Eastern Ontario ports declined from 13.33 per cent in 1958 to 3.67 per cent in 1971.

Traffic in all commodities on the Montréal-Lake Ontario portion of the St. Lawrence Seaway has increased tremendously from 11,762,000 tons in

TABLE 14.3

Traffic at Selected Major Ontario and Quebec Ports, 1958-76
(thousand tons loaded and unloaded)

	<u>1958</u>	<u>1960</u>	<u>1965</u>	<u>1973</u>	<u>1976</u>	<u>Seaway Traffic^a 1976</u>
Quebec:						
Montreal	17,750	17,888	21,911	21,171	17,159	5,400
Quebec	3,997	4,230	6,329	15,923	13,405	2,234
Port Cartier		154	9,354	17,230	23,905	9,269
Baie Comeau	495	1,674	8,435	8,381	7,712	3,702
Sept-Isles ^b						
Pointe Noire	9,178	11,506	18,674	29,057	27,915	14,566
Trois-Rivières	2,703	2,752	4,776	3,938	3,343	968
Sorel	2,299	2,720	4,592	6,257	5,896	951
Contrecoeur	2,959	1,254	966	2,505	3,008	1,093
Ontario:						
Toronto	4,406	4,559	5,826	3,359	3,098	2,336
Sarnia	3,042	3,295	4,175	7,859	7,967	1,043
Hamilton	6,194	8,150	10,294	13,087	13,325	13,651
Thunder Bay ^c	7,639	12,106	17,038	20,117	20,183	13,494

^a Traffic of the Port that passed through one or both sections of the Seaway.

^b 1973 on includes Pointe Noire.

^c Formerly Port Arthur-Fort William

Sources: Canada, Statistics Canada, Shipping Report, Origin and Destination for Selected Ports, Part IV, Vol. 1, Cat. No. 54-206 (Ottawa: Information Canada, various years); The St. Lawrence Seaway Authority and the St. Lawrence Seaway Development Corporation, Traffic Report of the St. Lawrence Seaway, 1976 (Cornwall, Ontario and Massena, New York: 1977).

1958 to 54,397,000 in 1976, the peak being recorded in 1973 (Table 14.1). The traffic at most of the Quebec and Western Ontario ports (e.g., Sarnia, Hamilton, Thunder Bay) has also increased. But the Seaway has not benefitted Eastern Ontario, rather; it has destroyed the transshipment traffic at Eastern Ontario ports.

While it is hard to quantify precisely the harmful effects of the St. Lawrence Seaway on the economy of Eastern Ontario, it is estimated that since its opening, the ports of Eastern Ontario have lost about \$74 million (in 1973 dollars) in direct income by 1975. This figure has been estimated by calculating first tons of cargo lost which were being handled at Eastern Ontario ports before 1959. Assuming that cargoes at these ports would have continued at the 1958 level if the Seaway had not been constructed, it is estimated that between 1959 and 1975 the Region lost about 4,683,000 tons of cargo to other ports in Quebec and Ontario. Of this total, about 10 per cent would have consisted of general cargo and the remainder of bulk cargo. Following Geniffer Sussman, who estimates that one ton of handling and shipping of general cargo creates a direct income of \$55.91 and that one ton of bulk cargo creates a direct income of \$11.29, it is estimated that the Eastern Ontario ports lost \$26.16 million from the loss of general cargo and \$47.58 million from the loss of bulk cargo.

From these figures, indirect and induced income effects of the foregone income can be calculated by multiplying it by the coefficient of total income multiplier of the transportation and trade sector, which was 1.13 in 1976 (Table 19.2). Thus, the Region lost a total income of 84.44 million dollars as a result of the construction of the Seaway.

¹Geniffer Sussman, The St. Lawrence Seaway: History and Analysis of Joint Waterway, Canada-U.S. Prospects, (Montreal: C.D. Howe Research Institute (Canada), National Planning Association (U.S.A.), 1978), p. 84.

The benefits to the Region in the form of cheap electric power must be set against the loss of transshipment traffic. Table 14.4 shows the net monthly bills for selected municipalities for the use of 1 kW of industrial power for 200 hours in 1957 (i.e., two years before the opening of the St. Lawrence Project) and 1964 (i.e., 5 years after the completion of the Project).¹ The Table indicates that with the exception of Guelph, the net monthly bills in the municipalities of Central and Western Ontario have remained constant or fell only marginally between 1957 and 1964. But the net monthly bill in Eastern Ontario municipalities were lower and more uniform than those in municipalities in Central Ontario and Western Ontario. For example, the net monthly bill for 200 kW.h in the Municipality of Ottawa was \$2.43 in 1964, compared with \$2.91 in Toronto, \$2.97 in Guelph, \$2.70 in Niagara Falls, \$2.70 in Windsor, and \$2.29 in Hamilton. Recent figures from Statistics Canada also confirm this difference. A monthly bill for the consumption of 60,000 kW.h was \$1,883.18 (\$1,463.18)² in Ottawa as compared to \$1,905.20 (\$1,846.80) in Toronto, and \$2,256 in Hamilton (\$1,536).³ Similar differences have also been found in the bills for residential consumption, e.g., \$7.43 for 250 kW.h a month in Ottawa, \$10.68 in Toronto, \$11.60 in Hamilton.⁴

¹ The years 1959 and 1964 are chosen as a matter of availability of data.

² Figures in parentheses represent off-peak consumption charges.

³ Canada, Statistics Canada, Electricity Bills For Domestic, Commercial and Small Power Service, Examples of the Application of Rates, 1980, Cat. No. 57-203 Annual (Ottawa: Supply and Services of Canada, 1980), p. 13.

⁴ Ibid., p. 8.

The evidence of reduction in electric rates in Eastern Ontario municipalities between 1957-1964 is not that conclusive. The electric rates in Belleville rose marginally and in Brockville significantly.

Table 14.4

Net Monthly Bill for the Use of
1 Kw of Industrial Power for 200 h.

<u>Municipality</u>	<u>1957</u> \$	<u>1964</u> \$
Niagara Falls	2.70	2.70
Hamilton	2.29	2.25
Toronto	2.91	2.91
Kitchener	2.92	2.70
Guelph	2.34	2.97
Windsor	2.70	2.70
Ottawa	2.61	2.43
Kingston	-	2.43
Belleville	2.38	2.43
Brockville	2.07	2.43

Source: Ontario, The Hydroelectric Power Commission of Ontario,
Annual Reports for 1957 and 1964.

XIV.7 Summary

In the present century, railways in Eastern Ontario did not expand, rather some of the railway lines were dismantled because of their uneconomical operations.¹ Roads, on the other hand, have witnessed a phenomenal expansion with the invention of the internal combustion engine and automobiles, and improved highway construction techniques. Road transportation has provided strong competition to railways. However, this situation may change with the present energy crisis. Air transportation has become increasingly popular in the Region, especially in the Ottawa area, primarily because of the presence of the federal government.

Water transportation in the Region does not play a significant role any longer. The opening of the St. Lawrence Seaway in 1959 ruined the ports

¹One of the reasons for their uneconomical operations was the disappearance of lumber resources in the Ottawa Valley for which they had been built to begin with.

of the Region, which lost their transshipment business as well as other traffic to other points in Quebec and Ontario. The construction of the St. Lawrence Hydroelectric projects, however, seems to have benefitted the Region in the form of lower hydroelectric energy cost , though not conclusively.

CHAPTER XV

Forestry in the Twentieth Century

At the turn of the century, a "revolution" in the forest-based industries occurred. With increasing costs, a dwindling timber supply in Eastern Canada especially in Eastern Ontario, and competition from lumber in British Columbia, the lumber industry in Ontario in general and Eastern Ontario in particular was entering an era of decline. This decline continued up to the 1930's. Barring cyclical and erratic fluctuations, the production of lumber in Ontario had fallen to a 60-year low in 1932 (Table 15.1). On the other hand, a young but potentially important new industry, later known as the pulp and paper industry, was forging ahead; several new mills were being built and capital was pouring into them. Many old firms, such as the Prices and the Edwards, started to make themselves over into pulp and paper companies, or sold out to new companies.¹ Some old firms, which had built up operations around important power sites and ample supplies of small pulp logs, not suitable for sawmilling, began to turn from sawmilling to the production of pulp and newsprint.² On the national scene, the frontier of the lumber industry had shifted from the east to the west, i.e., from Quebec and Ontario to British Columbia with the opening of the Panama Canal. Such was the nature of the revolution in the forest-based industries - a shift from lumber to pulp and paper.

XV.1 Early History of the Pulp and Paper Industry in Eastern Ontario

Although the first paper mill in Canada was established as early as 1804 in St. Andrews in Quebec, the industry had its beginning in Ontario in

¹A.R.M. Lower, The North American Assault ..., op. cit., p. 194.

²An example of this kind was of J.R. Booth of Ottawa. H.A. Innis, "Pulp-and-Paper Industry," in W.S. Wallace (editor), Encyclopedia of Canada (Toronto: University Associates of Canada, 1935), p. 178.

1825 with the establishment of paper mills at Crooks Hollow and Don Valley.¹ Eastern Ontario saw its first paper mill in the late 1850's when a paper mill was established by the Fords in the Napanee River Valley near Belleville.²

The Census of 1871 recorded seven paper mills in Ontario; four of them were located in Eastern Ontario (three in the County of Hastings, one in Cornwall). The number of paper mills in Eastern Ontario rose to six in 1881 and to seven in 1891.³ Employment provided by the industry increased to 265 in 1891 from 174 in 1881. According to the 1901 Census, there were then seven paper mills and one pulp mill in Eastern Ontario. In 1903, another pulp and paper mill was established in Ottawa by Booth.⁴

The early mills used rags, especially linen, as raw material and faced a serious problem of a sufficient supply of rags. This problem was compounded after 1840 when paper machines were introduced.⁵ The introduction

¹H.A. Innis, "Pulp-and-Paper Industry," op. cit., p. 177.

²J.P. Stephenson, "Quebec's Pulp and Paper Industry Since 1803," Pulp and Paper Magazine of Canada, Vol. 51 (November, 1950), pp. 95-103.

³Canada, Department of Agriculture, Census of Canada 1880-1881 (Ottawa: 1882), Vol. 3, p. 471; and Canada, Census of Canada 1890-1891, Department of Agriculture and Statistics (Ottawa: Printer to the Queen's Most Excellent Majesty, 1894), Vol. 3, pp. 242-243.

⁴H.A. Innis, "Pulp-and-Paper Industry," op. cit., p. 178.

⁵R.A. Roberge, The Timing, Type, and Location of Adaptive, Inventive Activity in the Eastern Canadian Pulp and Paper Industry: 1806-1940, A Ph.D. Dissertation, Clark University (Ann Arbor, Michigan: University Microfilms, A Xerox Company, 1975), p. 77.

of this machine made it possible to turn out finished paper at a much higher rate than with the hand-made technique. As the supply of rags could not keep pace with the requirements of the paper machine, it limited the expansion, and a situation of "technological disequilibrium" developed.

Technological Developments

This situation could only be overcome by a new technology - an alternative source of raw materials. The introduction of wood pulp as a material for paper making was the first step in this direction. Two types of processes came to be used to extract components from wood which were needed for the manufacture of paper, viz., the groundwood (or mechanical) and the chemical processes.¹ There are three chemical processes, i.e., sulphide, sulphate and soda processes, depending on which chemical is used to dissolve the non-fibrous components of wood. The first wood pulp mill (using the Sulphate Process) in Eastern Ontario was established in Cornwall in 1888.²

These technological breakthroughs completely revolutionized the pulp and paper industry. As a result, the capacity of the pulp and paper industry in Eastern Ontario increased. According to a map by Roberge, Eastern Ontario in 1890 possessed 10.6 per cent of the total pulp and paper capacity of Eastern Canada, compared with 5.7 per cent between 1860-1890.³

¹The groundwood process uses mechanical means to separate the wood fibres from other components of wood, most commonly by forcing logs against huge grindstones or by subjecting wood chips to the millstone-like action of rotating discs. Chemical pulping separates cellulose fibres by dissolving the lignin which binds them. For this process, wood chips are placed in a large cylindrical tank known as a digester, and then cooked with a chemical liquor at a high temperature. Cooking dissolves virtually everything that the wood contains except the pulp fibres. Canadian Pulp and Paper Association, From Watershed to Watermark (Montreal: No date of publication), p. 9.

²H.A. Innis, "Pulp-and-Paper Industry," op. cit., p. 178.

³R.A. Roberge, op. cit., Figure 19, pp. 130, 137.

XV.2 The Development of the Industry, 1901-1971

Market Developments 1901^m-1929

Besides the technological changes in the manufacture of paper from wood pulp, another event occurred in 1911 that transformed the Canadian industry's prospects. The U.S.A. granted free entry to Canadian newsprint.¹ Free access to the large and rapidly expanding U.S. market for newsprint and paper for books, created by the development of mass media and the spread of compulsory education, made possible the expansion of the Canadian industry, including Eastern Ontario's pulp and paper industry.

Other factors that affected the demand for newsprint in general were its high income elasticity of demand, the greater demand for advertisement, and the fall in its price resulting from technological advance in the industry. The average price of newsprint changed from \$340 per ton in 1862 to \$62.50 in 1891, to \$36 in 1900, and to \$42 in 1915.²

As a result of these factors, the consumption of paper per capita in Canada increased from eight pounds in 1890 to sixty-two pounds in 1929.³ To take advantage of this rising demand, the number of pulp and paper plants in Eastern Ontario increased from seven in 1901 to thirteen in 1911. In the

¹The most widely cited reasons for opening the U.S. paper markets were: -

- (1) the depletion of American forests,
- (2) the 'Canadian provinces' embargo on pulp wood exports, and
- (3) the American publishers' desire to have an alternative source of newsprint and a cheaper supply.

²V.W. Bladen, An Introduction to Political Economy (Toronto: University of Toronto Press, 1964), p. 178.

³Ibid., p. 176.

absence of data at the regional level, one can form some idea of the growth of the industry in Eastern Ontario from its growth in Ontario as a whole (Table 15.1). The output of pulp in Ontario rose by 480 per cent from about 112,000 tons in 1908 to about 650,000 tons in 1917. The paper industry (more than 80 per cent of its output consisted of newsprint)¹ experienced a similar increase.

The expansion of the pulp and paper industry was ~~due~~ not only to changes in technology, but also to the availability of material inputs in massive quantities, i.e., water, wood and power in Eastern Ontario. With regard to water, Spry and Brown state: "the industry has indeed grown to its present grand stature only because of huge water power potential, on the great rivers that flow through the Canadian Shield."² The Ottawa and the St. Lawrence Rivers and their tributaries gave easy access to vast stores of pulpwood and provided for their transportation. The many falls on these rivers and their tributaries provide sites for generating hydroelectric power.³ (For more on this and on the development of hydroelectric power in the Region, see a later section "Pulp and Paper and Hydroelectric Power" in this chapter).

¹ Canada, Dominion Bureau of Statistics, The Pulp and Paper Industry 1950 (Ottawa: 1951), p. H-12.

² I.M. Spry, and H. Brown, "Hydroelectric Power," Encyclopedia Canadiana (Toronto: Grolier of Canada Limited, 1975), p. 216. The author is aware of the encyclopedic nature of the source; however, in his opinion, the reference is one of the best sources for the history of hydroelectricity in Canada.

³ The pulp and paper industry requires water for pulp processing, waterways for floating down the logs from forests, and falling water to provide power. In the early stages, hydraulic power was used by a direct connection between hydraulic turbines and the machinery of the industry. Currently, waterfalls are used to generate hydroelectric power which drives machinery.

TABLE 15.1

Comparative Production Statistics of Lumber,
Pulp & Paper Industries, Ontario, for selected years

	1908	1911	1917	1929	1932	1944	1950	1962	1970
Lumber (in f.b.m ³)	1,294	1,716	1,110	913	212	567	819	622	771
Pulp (in tons) '000	112	-	650	-	790	1,330	2,297	3,052	3,969
Total Paper (in tons) '000	150	-	600	-	760	1,140	1,900	2,967	2,891 (shipment)

Sources: (1) Ontario, Report of the Royal Commission on Forestry, 1947, p. 49.

(2) Canada, Dominion Bureau of Statistics, Canadian Forestry Statistics, Revised 1959, Cat. No. 25-502, Occasional (Ottawa: 1960), p. 32.

(3) Canada, Dominion Bureau of Statistics, Canada Year Book, 1965 (Ottawa: Queen's Printer, 1965), p. 522.

(4) Canada, Statistics Canada, Canada Year Book, 1972 (Ottawa: Information Canada, 1973), pp. 451-452.

*Thousand of feet, board measure.

TABLE 15.2

Principal Statistics of the Pulp and Paper Industry,
Eastern Ontario Region, Selected Years*
(Current Dollars)

	Establishments (no.)	Employees (no.)	Salaries and Wages (\$'000)	Net Value of Products (\$'000)	Selling Value of Factory Shipments (\$'000)
1949	4	2,762	7,476	15,910	34,369
1951	4	3,099	10,057	22,395	52,273
1956	3	3,166	12,836	26,566	55,535
1957	3	3,041	12,660	23,860	52,438
1958	3	2,918	12,845	25,983	52,340
1974	6	3,150	35,000	-	200,000

Sources: (1) Ontario, Ministry of Economics, Eastern Ontario Region, Economic Survey, (Toronto: Economic Statistics Branch, 1960), p. 91.

(2) Ontario, Ministry of Treasury and Economics, Special Tabulation (Toronto: Economic Development Branch, 1979).

*Data are not available for the period between 1959-1973.

The pulp and paper industry did not use the types of wood that had almost been exhausted by the lumber industry. Softwoods such as spruce, balsam, hemlock, and jackpine and small trees which are still found in abundance in the Region, became the source of supply.

Thus, the combination of such factors as abundant water power, water transport, proximity of the market for newsprint, and the availability of an adequate supply of pulpwood favoured the expansion of the pulp and paper industry in the early part of the twentieth century. The net value of pulp and paper output for Ontario reached a level in 1929 which was not again attained until 1939.¹ By 1931, there were three pulp and paper mills and two paper mills in Eastern Ontario. Unfortunately, no statistics of value of output, the number of employees, etc. are available.

Depression and Recovery: 1929-1945

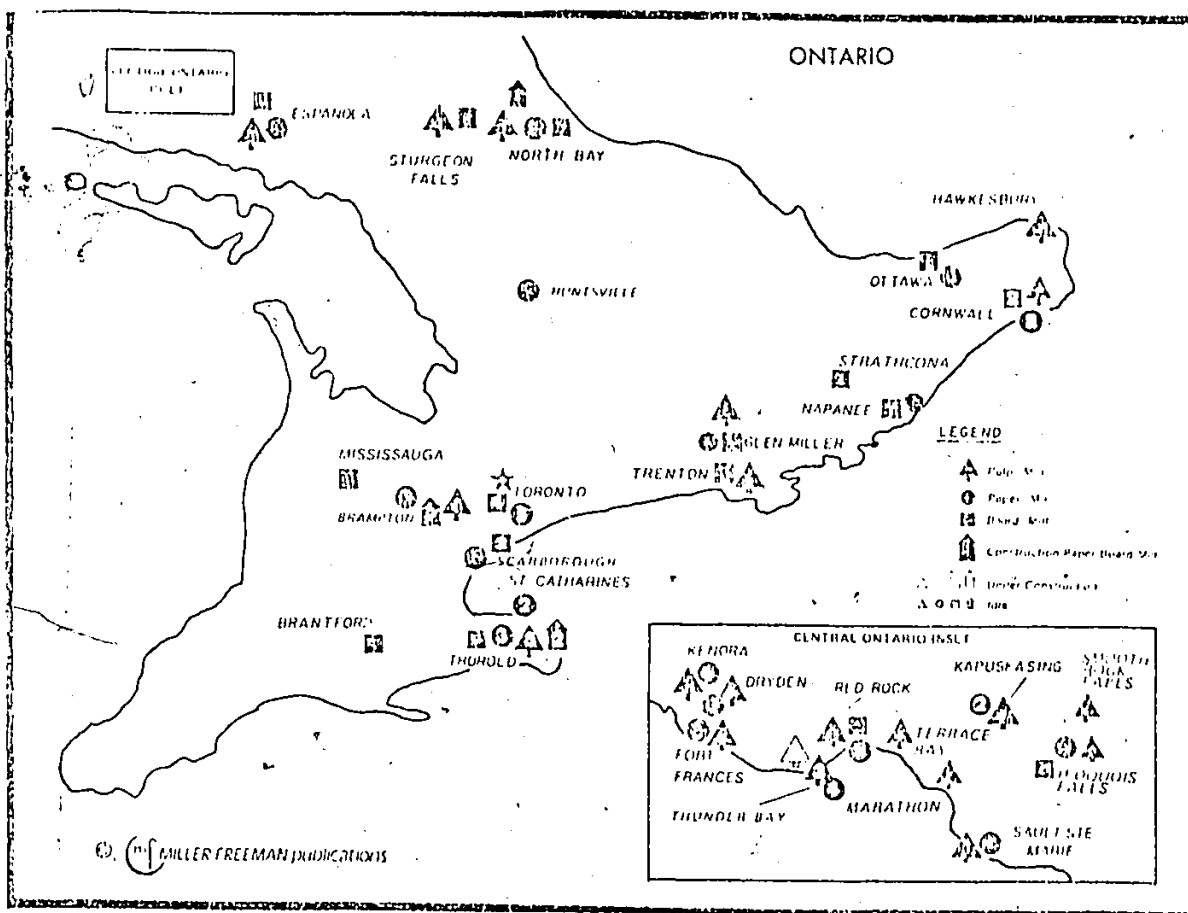
Peak production of the pulp and paper industry in 1929 was followed by a decline during the depression of the 1930's. The gross value of the output of the pulp and paper industry at the national level dropped from \$243,970 in 1929 to \$123,415 in 1933.² The general wholesale price index (1935-1939=100) fell from 124.6 in 1929 to 87.4 in 1933.³ This decline in output was due not only to the general depression but also to the over-expansion of plants in the pre-depression period, and the decline in the U.S. demand for newsprint. However, the industry revived in 1937 and in 1939 its production reached 4.5 million tons, which was an increase of 12.5 per cent over the output of 1929.

¹Canada, Dominion Bureau of Statistics, Canadian Forestry Statistics Revised 1959, Cat.No. 25-502, Occasional (Ottawa: 1960) Table 14.

²Canada, Dominion Bureau of Statistics, The Pulp and Paper Industry 1950, Catalogue No. CS36-204 (Ottawa:1951), pp.4-6

³Canada, Dominion Bureau of Statistics, Prices and Price Indexes 1951, op. cit., p.25.

Pulp and Paper Mills, Ontario, 1979



Source: 1979 Post's Pulp and Paper Directory (San Francisco: Miller Freeman Publications Inc., 1979), p. 243.

Post-war Growth: 1945 to Present

The pulp and paper industry continued to grow in the post-war period. The growth of the industry was a general reflection of the rising standard of living. For instance, the net value of Canadian pulp and paper output increased more than 36 per cent between 1945 and 1955. The net value of output in Ontario increased by about 400 per cent during the same period.¹

Corresponding figures for Eastern Ontario, however, are not available for the same period. In 1949, there were 42 pulp and paper mills in Ontario, four of which were located in Eastern Ontario, providing employment to 2,762 workers. The shipments were valued at \$34.3 million (Table 15.2).

In 1958, the number of pulp and paper mills had fallen to three. They employed 2,900 workers and produced factory shipments with a gross value of \$52.3 million and value added of \$26 million. Thus, between 1949 and 1958, the net value of the output of the pulp and paper industry in Eastern Ontario rose by about 61 per cent, compared with a 400 per cent increase in all of Ontario (See Table 15.2 and the footnote on this page).

In 1974, the latest year for which figures are available, there were six pulp and paper mills in Eastern Ontario (See Table 15.3), employing 3,150 workers, distributing about \$35 million in wages and salaries, and shipping output worth \$200 million. About 52 per cent of the total employment and 69 per cent of the total value of shipments of the forest industry were accounted for by the pulp and paper industry.

Compared with other manufacturing industries in the Region, it is the third largest industry measured in terms of value added and the fifth largest in terms of the value of shipments and employment (Table 17.1).

¹Canada, Dominion Bureau of Statistics, Canadian Forestry Statistics, Revised 1959, Cat. No. 25-502, Occasional (Ottawa: 1960), Table 19, p. 4.

TABLE 15.3

Forest Industry Statistics for Eastern Ontario - 1974

	<u>Employees</u>	<u>Wages and Salaries (\$million)</u>	<u>Shipments (\$million)</u>	<u>% Exported</u>
Logging	400	3.5	14	5%
*Wood Industries	2,536	19.2	78.8	15
Pulp & Paper	3,150	35.0	200	20
- Domtar, Cornwall	1,600	17.8	100	25
- CIP, Hawkesbury	450	5.0	30	30
- Eddy, Ottawa	600	6.7	40	20
- Strathcona, Napanee	200	2.2	11	0
- Domtar, Trenton	150	1.7	10	0
- Trent Valley, Trenton	150	1.7	9	0

*More detailed statistics for each individual SIC are contained in Standard Industrial Classification Manual, Catalogue No. 31-209, Statistics Canada.

Source: Ontario Ministry of Treasury and Economics, Special Tabulation, Economic Development Branch, 1979.

Exports

Table 15.3 indicates that 20 per cent of the total shipments of the pulp and paper industry of Eastern Ontario are exported. This contrasts glaringly with the 75 per cent of the total value of shipments exported at the national level. This difference in the proportion of shipments exported is due to the fact that none of the pulp and paper mills in the Region manufacture newsprint,² 90 per cent of which is exported at the national level. This also indicates that a large

¹ Five-yearly average figure calculated for the years 1972-1977 from Canada, Statistics Canada, Canadian Forestry Statistics, Catalogue No. 25-202 Annual (Ottawa:various years), Tables 31, 35, 36, and 37.

² While separate statistics on newsprint production are not available at the establishment level, Statistics Canada publication The Pulp and Paper Industry indicates that none of the pulp and paper mills in Eastern Ontario produces newsprint. They produce stationary paper, book paper, twine paper, wrapping paper and paper boards.

proportion of the value of shipments is consumed within the Region.¹

XV.3 Pulp and Paper, Transportation and the Economy of Eastern Ontario

With the advent of modern roads, pulp and paper mills built roads to and through their woodcutting limits to obtain pulpwood from areas not accessible to waterways. They paid tens of millions of dollars for the use of transportation systems. Rivers provided natural highways for the shipment of pulpwood. (The E.B. Eddy Company in Ottawa used the Ottawa River and the Cornwall mill used the St. Lawrence River to float wood). Because four tons of raw materials (pulpwood, coal or fuel, sulphur, limestone, etc.) are necessary to produce one ton of newsprint, accessibility to cheap water transportation has always been an important factor in the industry.² The rivers also provided sources for early electric power plants.

Pulp and paper mills require tremendous capital expenditures before they can produce a single ton of pulp. "An expenditure of \$50,000 to \$60,000 or more per ton of daily capacity in 1947 is not unusual (i.e., a 400-ton mill required \$20,000,000 to \$25,000,000) before it is possible to produce pulp or paper".³ This investment has direct, indirect and induced multiplier effects. An extra dollar spent on the final output of the pulp and paper industry in Ontario, according to the input-output table for Ontario, 1965, generates a total income of \$2.14 in all industries.⁴ The industry ranked thirty-ninth out of 48 industries on the basis of effects generated by a one-dollar increase in final demand.

In terms of backward linkages, for a purchase of

¹It has been confirmed by Supply and Services of Canada that majority of requirements for stationary paper, and tissue and sanitary paper by the federal government in Ottawa is met by pulp and paper mills located in the Region.

²H.A. Innis, "Pulp-and-Paper Industry", op. cit., p.176.

³Report of the Ontario Royal Commission on Forestry, op. cit., p.35.

⁴R.H. Frank, S.M. Batrik, and D. Haronitis, "The Input-Output Structure of the Ontario Economy", Ontario Economic Review, Vol. 8, No. 1 (January/February, 1970), pp. 3-33.

one dollar's worth of final output, the industry buys inputs worth 25 cents¹ from itself, 21 cents from labour, 2.2 cents from mining, 4 cents from the chemical industry, 5 cents from storage and transportation, 4 cents from utilities, 2 cents from communications, 5 cents from unallocated sectors, while 27 cents go towards other value added (excluding labour). This means that 47 per cent of the value of output of the pulp and paper industry goes to the purchase of intermediate inputs, and 53 per cent goes to other value added. As a large part of inputs is produced within the industry itself, the impact of the pulp and paper industry (through backward linkages) on other industries will be weaker than the industries (e.g., electronics, chemicals) which buy a large portion of inputs from other sectors.

Forward linkages emphasize further processing of outputs rather than inputs. In fact, the higher the proportion of an industry's output that is supplied to other industries to meet intermediate demand rather than to final demand, the greater the forward spread effects. In the case of the pulp and paper industry, products worth one dollar are sold to the following industries in the proportion given in brackets: Sugar (\$0.013), Synthetic textiles (\$0.033), other wood industries (\$0.171), pulp and paper (\$0.259), paper products (\$0.159), printing and publishing (\$0.065), chemical industries (\$0.01), miscellaneous manufacturing industries (\$0.012). The remaining portion (about \$0.28) goes to final demand.² This means that about 72 per cent of the output of the pulp and paper industry is consumed as intermediate inputs and the remaining 28 per cent is consumed as a final demand. Thus, forward linkage effects are relatively higher than backward linkage effects.

¹ It may be noted that the higher the value of inputs produced within the industry, the lower the degree of interaction the industry has with other sectors, which is the case with the pulp and paper industry.

² R.H. Frank, et al., op. cit., p. 3-33.

XV.4. Pulp and Paper and Hydroelectric Power

The pulp and paper industry is one of the largest users of hydro-electric power in the Province of Ontario (See Tables 15.4(a) and 15.4(b)). It is also the largest energy user from all sources of energy (Table 15.4(a)). In 1972, the value of electricity consumed per person employed in the pulp and paper industry amounted to \$1,480 which was highest among all the manufacturing industries of Ontario.¹ The amount spent on fuel and electricity from all sources was \$3,050 per person employed (Table 15.4(c)).

Total value added by the pulp and paper industry in Ontario stood at \$355,675,000 in 1972, and the amount spent on energy requirements per thousand dollars of value added was \$84 in the case of electricity and \$174 in the case of total fuel from all sources (15.4(b) and 15.4(c)). These figures were also highest among all industries. These figures show the importance of hydroelectric resources to the establishment and development of the pulp and paper industry.

XV.4.1 History of the Early Development of Hydroelectric Power in Eastern Ontario

In Eastern Ontario (and for that matter in Canada as a whole) the earliest recorded use of electricity derived from water power was for lighting a sawmill in Ottawa in 1882; five years later, hydroelectric power was distributed in a number of municipalities in Ontario and Quebec.² In 1888, electrical power was transmitted some 3 km (2 miles) to the Barber paper mill.

¹ Calculation based on the Tables 15.4(b) and 15.4(c).

² The Bank of Nova Scotia, "Hydroelectric Development in Canada," Monthly Review; New Series, No. 61 (June-July, 1951).

TABLE 15.4(a)

Largest Manufacturing Energy Users in Ontario 1972

	Percentage of Total Manufacturing Use					
	All Sources	Electricity	Natural Gas	Fuel Oil	Coal	Gasoline
Pulp and Paper Mills	12.6	13.8	13.5	10.9	22.2	0.9
Industrial Chemicals	11.6	10.4	12.9	11.6	0.8	1.6
Smelting and Refining	6.0	4.5	4.9	3.3	47.5	0.3
Iron and Steel Mills	10.9	12.5	11.8	12.0	0.0	1.1

Source: Ontario, Ministry of Treasury, Economics and Intergovernmental Affairs, Consumption of Fuel and Electricity by Ontario Manufacturing Industries, 1972 (Toronto: Ontario Statistical Centre, 1975), p. IV.

TABLE 15.4(b)

Electricity - Ten Largest Users in Ontario 1972

	Amount Used (\$Million)	Per Cent of Total Mfg. Use
Pulp and Paper Mills	30.1	13.8
Iron and Steel Mills	27.3	12.5
Industrial Chemicals	22.5	10.3
Motor Vehicle Parts and Accessories	10.8	4.9
Smelting and Refining	9.9	4.5
Petroleum Refineries	7.0	3.2
Motor Vehicle Manufacturers	6.4	3.0
Abrasives Manufacturers	5.4	2.5
Rubber Products Industries	4.1	1.9
Man-made Fibre, Yarn and Cloth Mills	3.8	1.7
Total	127.3	58.3

Source: Same as in Table 15.4(a), p. V.

TABLE 15.4(c)

Ontario's Energy Intensive Manufacturing Industries 1972

	Value Added in Mfg. (\$million)	Energy Cost Per \$1000 Value Added (\$)	Energy Cost Per Person Employed (\$)
Pulp and Paper Mills	355.7	174	3,050
Industrial Chemicals	281.4	203	5,241
Smelting and Refining	135.0	218	2,639
Cement Manufacturers	56.0	234	11,207
Clay Products Manufacturers	36.5	125	1,748
Abrasives Manufacturers	28.7	199	2,865
Lime Manufacturers	6.6	632	11,677
Miscellaneous Petroleum and Coal Products	2.9	184	2,789
Total Value Added in Manufacturing	902.8		
Per Cent of Total Value Added in Manufacturing	7.0		
Per Cent of Total Energy Consumption in Manufacturing	35.9		

Source: Same as in Table 15.4(a), p. II.

in Georgetown, Ontario.¹ In 1906, the Hydroelectric Power Commission of Ontario (HEPCO) was established to deliver energy supplies to various municipalities.

The early generation of hydroelectric power in Eastern Ontario is shown in Table 15.5. It is clear from the column "Development" that the pulp and paper industry was the main consumer of water power. In the case of direct-drive water, about 99 per cent of this generated in 1910 at the Chaudière Falls in Ottawa was developed and used by pulp and paper mills. Of the total hydroelectric power developed in Eastern Ontario (120,805 H.P.) in 1910, about 20 per cent was developed and used by the pulp and paper mills.

During the 1950's, three major hydroelectric generating stations were installed in Eastern Ontario - Robert H. Saunders on the St. Lawrence and Des Joachims and Chenaux (near Chat Falls) on the Ottawa. In March 1977, another hydroelectric unit was brought into service at Arnprior. As a result of these additions, the Region currently has a dependable generating capacity of 2,035,000 K.W. (Table 15.6).

There are some other small hydroelectric plants located at High Falls and Merrickville. Besides these plants, which are operated by Ontario Hydro, there were several plants in the Region, run by private companies or production firms. They include the generating station of Ottawa Hydro, the E.B. Eddy Company and the Ottawa Transport Commission (now Ottawa-Carleton Transpo)² on the Ottawa River. Power is also produced at generating stations on the Bonnechere, Gananoque, Mississippi and Rideau Rivers. External sources also supply Ontario Hydro with electric power, viz., Quebec Hydro, Mattawa Electric Light and Power Company and AECL at Douglas Point.

¹I.M. Spry, and H. Brown, op. cit., p. 221.

²Ottawa-Carleton Transpo no longer has a generating station.

TABLE 15.5

Major Water Power of Eastern Ontario, By River
and Tributaries, 1910

Power Site	Minimum H.P. Under Conditions of Minimum flow	Electrical Maximum Load (H.P.) Carried by the Plant	Electricity Developed and used (H.P.)			
			Electrical Energy	Pulp & Paper Industry	Other Indus- tries	Total
<u>St. Lawrence Canals</u>						
Cardinal					200	200
Iroquois		90			40	40
Morrisburg	1,410	350	1,350			1,350
Cornwall	5,250	1,300	2,780	800	300	3,880
<u>St. Lawrence River</u>						
Galops, Cardinal & Iroquois rapids	232,000					
Rapide Plat	178,000					
Long Sault	618,000	40,000	40,000			40,000
<u>Napanee River</u>						
Napanee	30			500		500
Strathcona			75			75
Camden East			75			75
Yarker	32			125		125
<u>Bonnechère River</u>						
Rabital cascades						
High Falls						
Eganville						
fourth chute	1,820			1,480		1,480
third chute						
<u>Mississippi River</u>						
Carleton Place	454	200	100	620		720
Almonte & Appleton	630	100	300	1,185		1,485
Galetta	780	215	1,800	115		1,915

TABLE 15.5 (Cont'd)

Major Water Power of Eastern Ontario, by River and
Their Tributaries, 1910

Power Site	Minimum H.P.	Electrical Maximum load (H.P.) Carried by the Plant	Electricity Developed and Used (H.P.)			
			Electrical Energy	Pulp & Paper Industry	Other Industries	Total
Tay River (Perth)	130	225	275			275
Muskrat River (Pembroke)	65				75	75
<u>Gananoque River</u>						
Gananoque			250		1,115	1,365
Napanee					500	500
<u>Moirs River</u>						
Belleville	2,243				315	315
Tweed	800		100		100	200
<u>Ottawa River</u>						
Carillon rapid	26,000					
Long Sault	200,000				2,000	2,000
Chaudière Falls	145,000	14,000	14,000	23,000	18,500	55,500
<u>Rideau River</u>						
Smiths Falls	536	375	750		2,470	3,220
Manotick						
Hogsback rapids	4,120				4,750	4,750
Ottawa-Rideau falls						
Merrickville	735	240	120		640	760
Grand Total						120,805

Source: Canada, Commission of Conservation, 1911, Water Powers of
Canada, pp. 106-119.

TABLE 15.6

Statistics of Electric Generating Stations of
Ontario Hydro in Eastern Ontario 1977

<u>River</u>	<u>Generating Station</u>	<u>Year of Installation</u>	<u>Dependable Capacity K.W.</u>	<u>Max. Output K.W.</u>
<u>St. Lawrence</u>	Robert H. Saunders	1958	702,000	874,000
<u>Ottawa</u>	Des Joachims	1950	368,000	378,000
	Otto Holden	1952	193,000	206,750
	Chenau	1950	110,000	118,000
	Chat Falls (Ontario half)	1931	84,000	95,000
<u>Madawaska</u>	Mountain Chute	1967	165,000	148,200
	Barret Chute	1942	172,000	160,000
	Stewartville	1948	166,000	156,000
	Arnprior	1977	75,000	73,800
<u>Total</u>			2,035,000	2,209,750

Source: Ontario, Ontario Hydro, Statistical Year Book, 1977, pp. 36-37.

The pulp and paper industry in Eastern Ontario consumes about 271 kW.h of electricity which is 12.7 per cent of the total electric consumption by the manufacturing sector of Eastern Ontario. It is forecast that, by the year 1990, the pulp and paper industry of Eastern Ontario will be consuming 11.25 per cent of the total electric consumption of the manufacturing sector.¹

In the past, the Eastern Ontario Region has enjoyed the advantages of an abundance of low cost hydroelectric power. Most of the municipalities in Eastern Ontario had lower rates than other municipalities in Ontario.² However, it is feared that the Ottawa area will be facing a shortage of electric power by the middle of the 1980's. According to Ontario Hydro (before 1972, the Hydroelectric Commission of Ontario) a large percentage of future load growth is expected to occur in the Ottawa area, and the transmission capacity connecting the area with the rest of the system will become inadequate.³

XV.5 Summary

The pulp and paper industry developed in Eastern Ontario as the square timber trade was disappearing and the lumber trade was declining. Its first major growth was based on new technology which made it possible to use wood pulp as the raw material for making paper, both by groundwood and chemical pulp; the abundant supply of pulpwood; the existence of natural waterways; and the availability of water power. The commercial use of hydroelectric power

¹Ontario Hydro, Requirements for Additional Bulk Power Facilities to Supply Eastern Ontario, A Submission to the Royal Commission on Electric Power Planning, January, 1979, p. C-3.

²Ontario, Hydroelectric Power Commission of Ontario, Annual Report, 1964 (Toronto: 1964), pp. 200-219.

³Ontario Hydro, Requirements for Additional Bulk Power, op. cit., p. 17.

accompanied by the rising demand for newsprint (resulting from the spread of education) in the twentieth century provided an impetus to the development of the industry. The advent of the generation and transmission of hydroelectricity released the pulp and paper mills to some extent from the constraints of direct-drive water power. High energy-intensive operation of the pulp and paper industry requires cheap sources of power to be competitive. The abundant and cheap supply of hydroelectric power in Eastern Ontario continues to be one of the bases for the industry. Other factors supporting the industry in the Region are: chemicals and the chemical industry (located mostly in Cornwall, where one of the leading pulp and paper plants of the Region is located), an adequate supply of pulpwood, the two major waterways, and the federal government as a source of demand for the products of the industry.

CHAPTER XVI

Agriculture in the Twentieth Century

This Chapter will study the growth of the agricultural sector of the Region in the present century, with special emphasis on recent growth. It will also examine whether the changes that occurred in the Region's agriculture in the second half of the nineteenth century continued into the twentieth century.

XVI.1 Agricultural Output and Yield Per Acre

A striking feature of Eastern Ontario's agriculture since 1901 has been an increase in yield per acre for almost every type of crop. The yield per cultivated acre of winter wheat has risen from 16.86 bushels in 1921 to 27.32 bushels in 1951, and to 39.10 in 1971, though the increase was slow between 1901 and 1921. The yield of barley per cultivated acre rose from 21.65 bushels in 1901 to 27.57 bushels in 1920, to 36.4 bushels in 1951 and to 47.5 bushels in 1971 (Table 16.1). Similar increases in yield per cultivated acre have been recorded for other crops such as oats, corn and mixed crops. Total production, however, has not increased for every crop. The production of winter wheat and oats actually fell between 1951 and 1971, owing to a reduction in acreage under these crops. For instance, the acreage under fall wheat declined from more than 14,453 in 1921 to 8,585 in 1951, and to 8,089 in 1971; that under oats fell from 518,051 in 1951 to 106,734 in 1971 (Table 16.1). These declines were perhaps due to increased acreage under hay and other fodder crops required for dairying and livestocking. In the case of barley, the acreage increased between 1901-1921 but fell between 1921-1951, and again increased between 1951-1971. However, between 1951 and 1971, the total value of field crops in the Region increased from about \$65 million in 1951 to about \$115

TABLE 16.1

Production and Acreage Statistics of Selected Crops
in Eastern Ontario, 1901, 1951, and 1971

	1901	1921	1951	1971
<u>Spring Wheat</u>				
Acreage	143,107	80,272	8,455	2,738
Output (bushels)	2,356,172	1,276,945	178,600	-
Yield per acre (bushels)	16.47	15.91	21.12	-
<u>Winter Wheat</u>				
Acreage	18,474	14,453	28,791	8,089
Output (bushels)	312,249	243,822	786,900	316,300
Yield per acre (bushels)	16.9	16.86	27.33	39.10
<u>Barley</u>				
Acreage	76,461	74,337	26,910	37,134
Output (bushels)	1,655,996	2,049,313	979,900	1,765,700
Yield per acre (bushels)	21.65	27.57	36.4	47.5
<u>Oats</u>				
Acreage	629,083	636,671	518,051	206,734
Output (bushels)	16,439,820	19,640,657	22,972,100	10,788,000
Yield per acre (bushels)	26.13	30.85	44.34	52.18
<u>Peas</u>				
Acreage	85,615	19,062	2,514	109
Output (bushels)	1,345,823	324,669	49,490	-
Yield per acre (bushels)	15.77	17.03	19.60	-
<u>Fodder Corn</u>				
Acreage	-	100,946	67,907	137,394
Output (tons)	-	817,855	608,600	1,833,600
Yield per acre (tons)	-	8.10	8.96	13.44
<u>Shelled Corn</u>				
Acreage	42,805	-	-	96,684
Output (bushels)	2,053,678	-	-	7,556,700
Yield per acre (bushels)	47.97	-	-	78.15
<u>Bay</u>				
Acreage	768,791	1,003,173	1,003,173	812,122
Output (tons)	779,336	1,019,718	2,092,300	1,923,700
Yield per acre (tons)	1.01	1.00	2.08	2.36
<u>Mixed Crops</u>				
Acreage	45,758	79,256	137,640	67,778
Output (bushels)	1,194,249	2,492,382	5,812,800	4,109,300
Yield per acre (bushels)	26.09	31.45	42.23	60.6
<u>Potatoes</u>				
Acreage	46,937	38,972	11,071	2,547
Output (bushels)	5,494,902	4,070,867	1,451,800	616,700
Yield per acre (bushels)	117.06	104.45	131.13	242.12

- Sources: (1) Canada, Department of Agriculture, Census of Canada, 1901-1902, Vol. B, (Ottawa; 1904), pp. 187-189.
- (2) Ontario, Ministry of Agriculture and Food, Agricultural Statistics for Ontario, 1951 (Toronto: No date for publication indicated), pp. 50-55.
- (3) Ontario, Ministry of Agriculture and Food, Agricultural Statistics for Ontario, 1971 (Toronto: No date for publication indicated), pp. 32-57.
- (4) Canada, Statistics Canada, Census of Canada, 1921, Vol. 6 (Ottawa: Printer to King's Most Excellent Majesty, 1925), pp. 444-451.

Note: Acreage is cultivated acreage and yield per acre is yield per cultivated acre.

million.¹

A major portion of the field crops grown is used for the Region's livestock. In 1951, out of total area under crops (1,841,583 acres), about 1 million acres or 54 per cent were devoted to the production of hay (Table 16.1). This percentage rose to 58 in 1959.²

XVI.2 Livestock and Dairy Farming

The switch to livestock and dairy farming, which had occurred in the Region in the second half of the nineteenth century, continues into the twentieth century. Cattle are raised for dairy and beef purposes. According to the 1971 Census, Eastern Ontario has 680,564 head of cattle, which is an increase of 12.5 per cent over the 1951 figure of 606,642. The Region's cattle constituted 22 per cent of the total population of Ontario cattle. Slightly more than one-half of all cattle in the Region are found in the Ottawa Valley, the largest concentration being in Renfrew County. The value of cattle increased from \$49.06 million in 1921 to \$122.84 million in 1951 and to \$152 million in 1971.³

Although there were more cattle in 1971 than in 1901, the cattle population declined marginally between 1921 and 1931, 1961 and 1971 and significantly between 1941 and 1951. The largest increase was recorded between 1901 and 1921. The cattle population of the Region has lately stabilized around 700,000 which constitutes about 19.5 per cent of the total

¹Ontario, Agricultural Statistics of Ontario, 1951 (Toronto: Ministry of Agriculture and Food, No Date for Publication Indicated), pp. 50-55. Figure for 1971 is estimated from total Ontario figure, by multiplying the proportion of total Ontario agricultural labour force engaged in Eastern Ontario by total value of Ontario Crops.

²Ibid., and Eastern Ontario Region, Economic Survey, op. cit., pp. 102-103.

³Calculated from Census of Agriculture, Ontario, Various Years.

number of cattle in Ontario.¹ According to the 1921 Census, the Region had 725,117 head of cattle, a total which has not been achieved again since then.²

Dairy farming in Eastern Ontario has grown remarkably as a result of the increased demand for fluid milk in the Ottawa area, that has resulted from the expansion of Public Service, especially during 1961-1971. Milk production in the Region totalled 1,599,547,000 pounds in 1971, 32.4 per cent of all provincial production.³

Although the Region produced large quantities of milk for sale as fluid milk, much of its milk output is processed into cheddar cheese, creamery butter and other dairy products. In 1959, cheddar cheese production aggregated 44.8 million pounds, an increase of 11 per cent over that produced in 1951. During the same period creamery butter output rose by 61 per cent to 16.8 million pounds.⁴ The Region accounts for approximately two-thirds of

¹Cattle population of Eastern Ontario for the various decennial censuses years was:

1901	386,276
1921	725,117
1931	686,096
1941	718,390
1951	606,642
1971	682,584

Source: Census of Canada, Various Years.

²See Footnote 1 above.

³Ontario, Ministry of Agriculture and Food, Agricultural Statistics for Ontario 1971, op. cit., pp. 99-100.

⁴Eastern Ontario Economic Survey, op. cit., p. 19. These figures refer to the Eastern Ontario Economic Region as opposed to the Eastern Ontario Planning Region.

the cheddar cheese and one-fifth of the creamery butter produced in the Province.¹ According to the 1951 Census, sales of all dairy products in 1950 amounted to \$32.35 million, compared with \$23.53 million from the sale of cattle and \$4.22 million from field crops. Thus, dairy farming dominates other agricultural activities of the Region, such as raising field crops and beef cattle.

XVI.4 Organization of Farming

The area of improved land in the Region has been secularly declining from 2,878,646 acres in 1921 to 2,713,785 acres in 1951, to 2,667,052 in 1956 and to 2,151,722 in 1971, a decline of 18.6 per cent over the 1921-1951 period and 21 per cent between 1951-1971 (Table 16.2). The corresponding declines experienced by the whole of Ontario were respectively 4 per cent and 14 per cent. The percentage decline in improved farm land in Central Ontario was larger than that in Eastern Ontario between 1921-1951, but slightly smaller between 1951-1971. However, in Western Ontario, the situation was different. It gained in improved farmland between 1921 and 1951, 1951 and 1956, and between 1961 and 1966. One of the main reasons for the decline in improved farm land is the conversion of cultivable land to alternative uses - commercial, industrial, residential, and the development of highways. The economic development of the Region over this period, the conversion of poor land from farming to recreation purposes, and the development of grain farming and cattle breeding in Western Canada have also forced marginal farmers to abandon their farms and seek alternative employment.²

¹ Eastern Ontario Region, Economic Survey, op. cit., p. 19.

² Owing to the relatively less income elastic demand for agricultural products, the income of the agricultural sector lags behind the income of other sectors, such as the manufacturing and services sectors. Thus, there is a tendency on the part of farmers either to abandon farming or to supplement farm incomes by working in other sectors. On the supply side, the supply curve might have shifted to the right due to technological changes, resulting in lower prices and incomes in the absence of support price policies and under inelastic demand conditions.

TABLE 16.2

Acreage of Improved Farmland in Eastern Ontario,
and Other Regions of Southern Ontario, by County, for
Census Years 1951, 1956, 1961, and 1971

Counties and Districts	1951					1956					1961					1966					1971				
	1921	1951	1956	1961	1966	1971	1921	1951	1956	1961	1966	1971	1921	1951	1956	1961	1966	1971	1921	1951	1956	1961	1966	1971	
Ottawa-Carleton	311,220	308,235	300,310	269,143	260,766	262,006	311,220	308,235	300,310	269,143	260,766	262,006	311,220	308,235	300,310	269,143	260,766	262,006	311,220	308,235	300,310	269,143	260,766	262,006	
Brantford	172,935	176,967	174,723	165,225	167,184	153,271	172,935	176,967	174,723	165,225	167,184	153,271	172,935	176,967	174,723	165,225	167,184	153,271	172,935	176,967	174,723	165,225	167,184	153,271	
Frontenac	190,431	166,534	178,390	155,054	153,061	125,961	190,431	166,534	178,390	155,054	153,061	125,961	190,431	166,534	178,390	155,054	153,061	125,961	190,431	166,534	178,390	155,054	153,061	125,961	
Glenora	166,600	161,722	171,039	169,008	165,348	141,794	166,600	161,722	171,039	169,008	165,348	141,794	166,600	161,722	171,039	169,008	165,348	141,794	166,600	161,722	171,039	169,008	165,348	141,794	
Greenville	148,545	125,379	116,201	100,864	111,666	89,191	148,545	125,379	116,201	100,864	111,666	89,191	148,545	125,379	116,201	100,864	111,666	89,191	148,545	125,379	116,201	100,864	111,666	89,191	
Leamark	195,785	174,516	178,098	164,761	168,523	148,586	195,785	174,516	178,098	164,761	168,523	148,586	195,785	174,516	178,098	164,761	168,523	148,586	195,785	174,516	178,098	164,761	168,523	148,586	
Leeds	201,147	188,070	169,862	168,496	174,768	149,481	201,147	188,070	169,862	168,496	174,768	149,481	201,147	188,070	169,862	168,496	174,768	149,481	201,147	188,070	169,862	168,496	174,768	149,481	
Lerroy and Addington	180,381	168,155	167,433	154,002	148,987	125,199	180,381	168,155	167,433	154,002	148,987	125,199	180,381	168,155	167,433	154,002	148,987	125,199	180,381	168,155	167,433	154,002	148,987	125,199	
Prescott	263,647	218,952	209,762	209,886	213,533	191,231	263,647	218,952	209,762	209,886	213,533	191,231	263,647	218,952	209,762	209,886	213,533	191,231	263,647	218,952	209,762	209,886	213,533	191,231	
Renfrew	319,555	300,702	290,327	283,069	270,286	233,080	319,555	300,702	290,327	283,069	270,286	233,080	319,555	300,702	290,327	283,069	270,286	233,080	319,555	300,702	290,327	283,069	270,286	233,080	
Russell	166,267	167,163	164,525	159,124	162,755	104,652	166,267	167,163	164,525	159,124	162,755	104,652	166,267	167,163	164,525	159,124	162,755	104,652	166,267	167,163	164,525	159,124	162,755	104,652	
Stormont	140,516	145,012	143,744	127,207	127,549	109,302	140,516	145,012	143,744	127,207	127,549	109,302	140,516	145,012	143,744	127,207	127,549	109,302	140,516	145,012	143,744	127,207	127,549	109,302	
Hastings	306,071	264,544	253,012	226,996	219,841	192,933	306,071	264,544	253,012	226,996	219,841	192,933	306,071	264,544	253,012	226,996	219,841	192,933	306,071	264,544	253,012	226,996	219,841	192,933	
Prince Edward	175,546	147,834	149,626	140,897	142,668	125,035	175,546	147,834	149,626	140,897	142,668	125,035	175,546	147,834	149,626	140,897	142,668	125,035	175,546	147,834	149,626	140,897	142,668	125,035	
Eastern Ontario	2,878,646	2,713,785	2,667,052	2,289,385	2,486,935	2,151,722	2,878,646	2,713,785	2,667,052	2,289,385	2,486,935	2,151,722	2,878,646	2,713,785	2,667,052	2,289,385	2,486,935	2,151,722	2,878,646	2,713,785	2,667,052	2,289,385	2,486,935	2,151,722	
Central Ontario	3,053,171	4,400,338	4,290,435	4,108,176	4,032,034	3,552,356	3,053,171	4,400,338	4,290,435	4,108,176	4,032,034	3,552,356	3,053,171	4,400,338	4,290,435	4,108,176	4,032,034	3,552,356	3,053,171	4,400,338	4,290,435	4,108,176	4,032,034	3,552,356	
Western Ontario	4,704,792	4,721,483	4,774,124	4,722,400	4,773,840	4,594,711	4,704,792	4,721,483	4,774,124	4,722,400	4,773,840	4,594,711	4,704,792	4,721,483	4,774,124	4,722,400	4,773,840	4,594,711	4,704,792	4,721,483	4,774,124	4,722,400	4,773,840	4,594,711	
Ontario	13,169,359	12,693,250	12,572,157	12,032,924	12,004,305	10,866,601	13,169,359	12,693,250	12,572,157	12,032,924	12,004,305	10,866,601	13,169,359	12,693,250	12,572,157	12,032,924	12,004,305	10,866,601	13,169,359	12,693,250	12,572,157	12,032,924	12,004,305	10,866,601	

Sources: (1) Canada, Dominion Bureau of Statistics, *Sixth Census of Canada, 1921*, Vol. 4, Agriculture (Ottawa: Printer to King's Post Excellent Majesty, 1925), pp. 118-119.

(2) Ontario, *Agricultural Statistics for Ontario, 1971*, op. cit., pp. 28-29.

TABLE 16.3

Census and Commercial Farms, Eastern Ontario, by County for Decennial Years

County or District	1951		1961		1971	
	Census	Commercial	Census	Commercial	Census	Commercial
Carleton	3,104	2,679	2,679	1,661	2,041	1,310
Brantford	1,881	1,630	1,559	1,262	1,182	893
Frontenac	2,262	1,748	1,618	1,051	1,165	578
Glenora	1,913	1,613	1,649	1,224	1,138	873
Greenville	1,499	1,220	1,144	705	877	418
Leamington	3,600	2,940	2,603	1,808	1,911	998
Leeds	2,170	1,866	1,840	1,185	1,396	792
Lerroy and Addington	2,380	1,964	1,936	1,331	1,413	844
Prescott	2,058	1,657	1,548	1,055	1,175	613
Renfrew	2,176	1,841	1,722	1,386	1,272	965
Russell	1,616	1,408	1,337	1,020	1,003	1,005
Stormont	3,575	2,838	2,739	1,678	1,992	669
Hastings	1,770	1,520	1,481	1,167	766	578
Prince Edward	1,908	1,592	1,329	997	996	642
Total Eastern Ontario	31,912	26,516	24,822	17,330	18,327	11,178

Sources: Census of Canada, Agriculture, Ontario, Various Years.

N.B. For definition of Census farms in 1951 and 1961, see footnotes on page 214.

Despite the increase in farm output, the number of farms has declined considerably in recent decades. Census farms in the Region have fallen from 43,523 in 1921¹ to 32,848 in 1941², 31,912 in 1951, 24,832 in 1961, and 18,327 in 1971 (Table 16.3).³ The decline in commercial farms has also been dramatic.⁴ They have declined from 26,516 in 1951 to 17,330 in 1961 and to 11,178 in 1971. This trend is expected to continue in the future, although at a slower rate. The process of mechanization of agriculture may have resulted in a decline in the number of farms through the consolidation of some farms and the abandonment of others which were small and, thus, unsuited for mechanization.

The size of the farms in Eastern Ontario has increased considerably.⁵

^{1,2} Calculated from Census of Canada, Agriculture, Ontario, for various censal years.

³ In the 1951 Census, a census farm was defined as a holding of three or more acres in size, or from one to three acres in size with an agricultural production valued in 1950 as \$250 or more. In the 1961 Census, a census farm was defined as an agricultural holding of one acre or more with sales of agricultural products during the past 12 months of \$50 or more. The definition for the 1971 Census remained the same. Thus, it would appear that the decline in census farms between 1951 and 1961 is understated or overstated, depending on the relative strength of the two situations" (1) The 1961 Census counted those farms between 1-3 acres that sold output of \$50 or more out of a total value of output less than \$250. (2) The 1961 Census did not count those farms between 1-3 acres that produced output worth \$250 or more, but could not sell output worth \$50 or more.

⁴ According to the Census of 1951 and of 1961, a commercial farm was defined as one with a total value of agricultural products of \$1,200 or more for a 12-month period. In the 1971 Census, this figure was increased to \$2,500. Thus, change in the definition overstates the 1961-1971 decline.

⁵ In 1951, the average size of farms in Eastern Ontario was 156 acres as compared with 139 acres in all of Ontario. The respective figures reported by the 1961 Census were 279 and 248 acres. (Census of Canada, Agriculture, Ontario, 1951, Vol. 6, pp. 16-1 to 16-7; and Census of Canada, Agriculture, Ontario, 1961, pp. 12-1 to 12-8). Since the 1961 Census, farm definition is more restrictive than that of 1951. It is, therefore, possible that a part of increase in the 1961 average census farm size was because some farms were dropped that were no doubt more than 3 acres or those farms that produced output worth \$250 (i.e., definition of the 1951 census farm) but could not produce a minimum of \$50 sales of agricultural products. The extent of increase in the average size of the census farms reported by the 1961 Census could be determined by counting the number of census farms of 3 acres or more in size and which could not produce \$50 sales of agricultural products in 1960 or those with a size of 1 to 3 acres and producing output more than \$250 but selling less than \$50 in 1960 and then adding them and their acreage to the total of census farms and acreage reported by the 1961 Census. Dividing this new total acreage by the new number of census farms, the comparative average census farm size for the 1961 Census has been calculated at 262 acres, compared with 279 acres without definitional adjustment.

As a matter of fact, the average size of farms in Eastern Ontario is larger than that in Ontario as a whole because of large tracts of the Pre-Cambrian Shield with poor soil and with relatively less pressure of urbanization on farming land.

Despite larger farms, the yield per cultivated acre of most field crops in the Region is lower than that of all Ontario. This is due, primarily, to the relatively poor soil and climate of the Region. The degree of mechanization of agriculture in the Region vis-à-vis other regions of Ontario seems to be another factor contributing to the low yield per acre.

XVI.5 Mechanization

The process of mechanization is a continuous one. The mechanization of agriculture has gone through two phases.¹ The period prior to 1900 can be considered phase I, during which manual labour was replaced by machines and animal power. Phase II started at the beginning of the twentieth century and involved the transition from animal power to mechanical power, initially of steam and later of diesel and gasoline tractors. It was realized that the tractor was a more economical form of power than the horse and that, when used in conjunction with the reaper-thresher or combine, the tractor could reduce the cost of harvesting and threshing by half.² The use of electricity to run the milling machines and other farm equipment also became very common.

The Post-World War I depression was one of the major reasons for the mechanization of agriculture. The depression produced an intensive period of experimentation which resulted in technological changes during the 1920's. "The year 1924

¹Merrill Denison, Harvest Triumphant, The Story of Massey-Harris (Toronto: McClelland and Stewart Limited, 1948), pp. 265-266.

²Ibid., p. 267.

stands out as an important milestone in the evolution of farm mechanization. It not only marked the turning point in the post-war depression but the real beginning of power farming."¹

Like other parts of Canada, Eastern Ontario was affected by the new wave of mechanization of agriculture. The number of working animals has been declining since 1931. The 1931 Census reported 117,161 farm horses in Eastern Ontario, while that of 1951 reported 70,165 horses. This figure fell still more dramatically to 18,761 in 1971.² In contrast, the use of tractors and other farm machinery has been increasing remarkably. The number of tractors on farms has risen from 5,416 in 1941 to 15,778 in 1951, and to 25,067 in 1971.³

The increase in the number of power-driven farm machines reflects the increase in the intensity of the use of agricultural machinery. Between 1951 and 1971, the average number of tractors per census farm increased from .49 to 1.37, and the number of farms using one tractor or more increased from 13485 to 14955. Also, the ratio of farms reporting one tractor or more to total census farm increased from .44 to .82 between 1951 and 1971. The use of other farm machinery has also increased in the Region. For example, the number of combines has increased to 3,804 in 1971, up 461 per cent from the 1951 level of 678.⁵ However, the number of tractors and other machinery per farm in other regions of Southern Ontario is higher than that in Eastern Ontario, which suggests that the degree of mechanization is less in the Region than in other regions of Southern Ontario.⁶

¹ Merrill Denison, op. cit., p. 263.

² Census of Canada, Agriculture, Ontario, Various Years.

³ Census of Canada, Agriculture, Ontario, for 1941, 1951 and 1971.

⁴ Calculated from Census of Canada, Agriculture, Ontario for 1951 and 1971.

⁵ Census of Canada, Agriculture, Ontario for 1951 and 1971. Corresponding figures are not available from the prior censuses.

⁶ For example in 1971, it was 3.0 tractors per census farm in Western Ontario.

XVI.6 Intensive Farming

Although the farmers of Eastern Ontario have recently increased the use of chemical fertilizers, they still fall behind their counterparts in Ontario as a whole. According to the 1971 Census, 33 per cent of the farmers in Eastern Ontario use chemical fertilizers as opposed to 55 per cent in the whole of Ontario. Hastings and Russell were the only two counties where more than 50 per cent of the farms made use of chemical fertilizers. The lower consumption of industrial fertilizers in Eastern Ontario may be partly due to the larger cattle population, which provides manure. The higher consumption of chemical fertilizers in the Central and Western regions of Ontario is perhaps due to the nature of the crops grown there, e.g., tobacco, which needs more fertilizer.

XVI.7 Farm Incomes

There are two types of farm income problems in Eastern Ontario:

- (1) A lower level of farm income compared with Ontario and the other regions of Southern Ontario, i.e., interregional farm income differences; and
- (2) Intraregional differences in farm income, i.e., incomes of farms within the Region differ significantly.

To understand these differences, it is necessary to explore the size and sources of farm incomes in the Region. Table 16.4 indicates that 35.14 per cent of the farms in Eastern Ontario earn less than \$2,500 per year, while the corresponding provincial percentage is 30.58. A relatively smaller percentage of farms in Eastern Ontario earns more than \$10,000 per year, i.e., 27.42 per cent compared with 37.82 per cent in Ontario as a whole. Sources of income, physical characteristics of land, and specialization in different crops

TABLE 16.4

Census Farms, Classified By Value of Agricultural Products Sold,
Eastern Ontario, By County (Census Division), 1971

County/Census Division	Below \$2,500		\$2,500-\$4,999		\$5,000-\$9,999		\$10,000 & Over		Total Farms Excluding Insti- tutional Farms
	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	
Dundas	289	24.45	176	14.89	307	25.97	410	34.69	1,182
Frontenac	585	50.21	199	17.08	203	17.43	176	15.10	1,163
Glengarry	325	28.55	210	18.45	260	22.85	343	30.14	1,138
Grenville	456	52.17	133	15.22	135	15.14	150	27.63	874
Hastings	911	47.67	298	15.59	312	16.33	388	32.72	1,909
Lanark	603	43.20	271	19.41	250	17.90	271	19.41	1,395
Leeds	567	40.18	275	19.49	308	21.83	271	17.44	1,417
Lennox and Addington	562	47.83	213	18.13	195	16.59	205	17.45	1,175
Ottawa-Carleton	726	35.66	331	16.26	322	15.81	657	32.19	2,036
Prescott	307	24.13	160	12.58	330	25.94	475	32.34	1,272
Prince Edward	334	33.30	170	16.95	207	20.64	292	29.11	1,003
Renfrew	985	49.50	368	18.49	312	15.68	325	16.31	1,990
Russell	188	24.54	96	12.53	176	22.98	306	39.94	766
Stormont	354	36.64	141	14.60	193	19.98	308	31.88	966
Total Eastern Ontario	7,192	39.34	3,041	16.63	3,510	19.20	4,577	25.04	18,280
Ontario	28,971	30.61	13,316	14.07	16,527	17.46	35,824	37.85	94,638

Source: Canada, Statistics Canada, Census of Canada, Agriculture, Ontario, 1971, Vol. 4.2, Cat. No. 96-707.

* There were 47 institutional farms excluded from Eastern Ontario.

seem to be the main reasons for interregional farm income differences.

Differences in interregional farm income arise from the different percentage of farmers engaged in "off-farm" activities and the levels of income derived therefrom. Table 16.5 shows that though percentage of farm tax-filers with "off-farm" income in Eastern Ontario is not significantly different from that in Ontario as a whole (i.e., 94.2 per cent vs. 95.2 per cent), the average net "off-farm" income in the Region is quite low, compared with that in the Province i.e., \$5,994 vs. \$7,014. The net farm income as a percentage of the total net income of farm tax-filers in the Region was 16 per cent, as opposed to 29.3 per cent in the Province. The average net farm income in the Region (\$1,213) was also much lower than that in all of Ontario (\$2,910). Low levels of off-farm income in Eastern Ontario become vividly clear when its comparison is made with Central Ontario. The average net off-farm incomes in Central Ontario was \$9,245 which was far above that in Eastern Ontario. However, average net off-farm income in Western Ontario was smaller than in Eastern Ontario. But the average net farm income in Western Ontario was much larger than that in Eastern Ontario. This is because of the fact that in Western Ontario agriculture is highly specialized and commercialized and does not encourage farmers to seek outside employment. In Eastern Ontario, crops grown are mainly fodder or non-commercial in nature. Finally, poor quality of soil in Eastern Ontario leads to low yield per cultivated acre, and hence low levels of on-farm incomes, compared to other regions of Southern Ontario.

Intraregional farm income differences result primarily from differences in types of soil, management ability of the farmer and income from "off-farm" employment. Table 16.4 shows that about 40 per cent of the census farms in Russell County derived an income of \$10,000 or more from the sale of agri-

TABLE 16.5

Farm Taxfilers' Average Income from Farm and Off-Farm Sources, Eastern Ontario,
and other Regions of Southern Ontario

Counties and Districts	No. Farm taxfilers (1)	Average net farm income \$ (2)	Taxfilers reporting off-farm income No. (3)	Average net off-farm income \$ (4)	Taxfilers reporting salaries & wages No. (5)	Average income from salaries & wages \$ (6)	Average net income from all sources \$ (7)=(2)+(4)	Net farm income as percentage of total net income % (8)=(2)÷7
Dundas	1,218	2,043	1,120	4,306	412	2,715	6,349	32.2
Frontenac	1,073	215	1,033	7,434	575	4,916	7,649	2.8
Glengarry	1,069	1,733	984	4,558	378	3,044	6,291	27.5
Grenville	757	465	709	6,607	361	4,582	7,072	6.6
Lanark	1,382	709	1,318	5,600	676	3,692	6,309	11.2
Leeds	1,376	1,424	1,302	4,997	593	2,996	6,421	22.2
Lennox & Addington	1,155	663	1,098	6,106	568	4,097	6,769	9.8
Ottawa-Carleton	1,998	430	1,919	11,320	1,114	7,158	11,750	3.7
Prescott	1,017	2,566	962	3,774	384	2,433	6,340	40.5
Renfrew	1,877	957	1,753	4,749	866	3,026	5,706	16.8
Russell	1,018	2,109	953	4,759	564	3,315	6,778	29.8
Stormont	904	1,425	835	5,051	424	3,348	6,476	22.0
Prince Edward	984	2,224	918	5,030	448	3,002	7,254	30.7
Hastings	2,051	1,106	1,944	5,977	1,078	3,828	7,083	15.6
Eastern Ontario	17,879	1,213	16,848	5,994	8,441	3,697	7,207	16.0
Central Ontario	39,682	2,017	37,990	9,245	20,189	5,480	10,610	23.5
Western Ontario	42,246	5,007	40,194	5,395	20,023	3,204	10,402	48.4
THE PROVINCE 1974a/	104,412	2,910	99,439	7,014	51,529	4,225	9,924	29.3

a/ Totals do not add up because 178 taxfilers could not be placed in a specific county.

Source: Ontario, Agricultural Statistics for Ontario, 1976 (Toronto: Ministry of Agriculture and Food, No date for publication indicated), Table 7.

cultural products, compared with only 15.1 per cent of the farms in Frontenac. The County of Frontenac has also the largest percentage of farms with incomes below \$2,500 per year. This situation was similar for Renfrew County. This suggests that income from the sale of agricultural products is lowest in the Pre-Cambrian Shield area. This does not mean, however, that they are necessarily the areas of farm poverty. As Table 16.5 shows, Frontenac has the largest average net income from all sources, which indicates the importance of "off-farm" income. Glengarry, which is the most rural county with 82 per cent of its people living in rural areas, has the second lowest level of average net income in the Region, the first being Renfrew County. This suggests that in some areas rural farm poverty still prevails.

The incidence of rural farm poverty is reduced in places where it is easier to find "off-farm" employment. (See for example the case of Frontenac County, where the people on farms can supplement their income with non-agricultural employment in Kingston).

By using factor analysis, Berry has identified and distinguished these patterns of rural poverty in Ontario: "The first is that of rural farm poverty, with a distribution which mirrors the spatial pattern of agricultural resources; rural farm poverty is at its most intense along the Frontenac Axis where the soil and upland area of the Shield extends Southwards into Eastern Ontario. The second pattern of economic disadvantage is that of rural non-farm poverty, which is at its most intense in the areas which are least integrated into the hierarchy of Ontario's functional economic areas and which do not have resources to exploit for recreational purposes; such areas are located along the divides which separate zones of urban influence. The third pattern is one of social disadvantage which appears to result from cultural differentiation of Ontario's population. Those areas which have the highest proportion of their residents French Canadians are also areas with the lowest level of education, the highest

infant mortality rates, and the like."¹

Thus, the study by Berry corroborates our findings concerning rural poverty, especially rural farm poverty in the Region.² A study in 1965³ of selected farms in Eastern Ontario sponsored by the Agricultural Rehabilitation and Development Assistance (ARDA), also revealed that wide differences in income obtained from "off-farm" sources were a major reason for income disparities on farms in Eastern Ontario. The study found that 61 per cent of farm owners farmed on a full-time basis and were dependent on their farm income for at least 51 per cent of their livelihood. Of the remaining 39 per cent, 14 per cent used their farm only as a rural residence, and 25 per cent were part-time farmers, with most of their income from "off-farm" jobs. The study went on to say: "The fundamental reason for any variation in family living income on the part-time farm can be attributed mainly to varying levels of earnings off the farm."⁴

It seems that farmers take up part-time outside employment to supplement their low farm income in order to support themselves. The living income on

¹ B.J.L. Berry, "Identification of Declining Regions: An Empirical Study of the Dimensions of Rural Poverty," in W.D. Wood, and R.S. Thoman (eds.), Areas of Economic Stress in Canada, Proceedings of Conference (Kingston: Industrial Relations Centre, Queen's University, 1965), p. 23.

² See Chapter XXI for more on rural poverty.

³ H.F. Noble, Variations in Farm Income of Farms in Eastern Ontario by Farm Type and Farm Class (Toronto: Ontario Department of Agriculture and Food, 1965). It may be noted, however, that the definition of the Eastern Ontario Region in Noble's study differs from that of the present study. Noble's study includes only 11 counties, while this study covers 14 counties. (See description of the Region in Chapter 1).

⁴ H.F. Noble, op. cit., p. 3.

full-time farms averaged \$2,500 a year per family, compared with an average of \$3,400 on part-time farms.¹

XVI.8 Summary

In the twentieth century, agriculture in Eastern Ontario has experienced a rapid growth in yield per acre mainly because of increased mechanization. It has continued to specialize in dairy products and livestock. Because of the growing demand from both domestic and external sources, the value of the sale and the output of dairy and beef products have far exceeded the value of field crops in the Region. In spite of these increases, yield per acre in the field crops continues to lag behind that of other regions in Ontario, especially of Central and Western Ontario.

The fact that the Shield area comprises about 60 per cent of the total area of the Region is a sufficient reason for the relatively low level of yield per acre and thus low average "on-farm" income. Low "on-farm" income is supplemented to some extent by income from "off-farm" sources. Even after allowing for income from other sources, the average net income of farmers in Eastern Ontario lags behind their counterparts in other parts of Ontario. This is because wages and salaries earned by farmers from "off-farm" income are also lower than those in all Ontario. Further, there are not many "off-farm" job opportunities in the Region due to the relatively low level of industrialization. However, there exist some opportunities, e.g., driving school buses or commercial buses to transport Civil Servants to the Ottawa-Hull area from the surrounding small areas. Consequently, average net "off-farm" income is higher in farming communities nearer to the national capital area than in those that are farther either from the national capital area or the Kingston area. It seems that some pockets of rural farm poverty still persist in the Region.

¹These figures and those given in Table 16.5 do not agree because of two different sources and areas covered. They also relate to two different years. See footnote number three on the preceding page.

CHAPTER XVII

Manufacturing in the Twentieth CenturyXVII.1 General

Eastern Ontario in the last two decades of the nineteenth century seemed to have experienced a relative slowdown in the growth rates of manufacturing activity, caused partly by concentration of manufacturing establishments in the major centres of Central Ontario and partly by the decay of the existing handicrafts and small-scale local establishments in the Region. This trend continued even into the early decades of the twentieth century. However, some modern industries have developed in the twentieth century, such as production of chemicals and chemical products, pulp and paper, computers and the manufacture of electronic equipment and transportation and communications equipment. Currently, the five largest manufacturing industries in descending order are:¹ food and beverages, textiles, paper and related products (including pulp and paper), chemical and chemical products, and printing, publishing and related products. Thus, the manufacturing sector of the Region continues to be dominated by traditional slow-growth industries such as cotton and textiles, and food and beverages. However, lately several high technology research-based industries involving electronics and communications equipment have made their mark. Most of these industries, notably computers and electronics, printing and publishing, and communication equipment depend largely on the federal government in Ottawa directly or indirectly for their market. Even a pulp and paper mill

¹This ranking is based on value added. See Table 17.1 for ranking based on the value of shipments and the level of employment.

TABLE 17.1

Manufacturing in Eastern Ontario, By Industry, Group, 1974

<u>Industry Group</u>	<u>Estab-lish-ments</u>	<u>Total Employees</u>	<u>Salaries and Wages</u>	<u>Value of Shipment</u>	<u>Value Added</u>	<u>Rank (Based on VS)</u>	<u>Rank (Based on L)</u>	<u>Rank (Based on VA)</u>
(N)	(L)	(W) (\$000)	(VS) (\$000)	(VA) (\$000)				
Food & Beverage Industries	212	7,351	63,094	643,043	224,661	1	2	1
Leather Industries	8	1,312	8,778	26,464	13,036	13	12	13
Textile Industries	44	8,430	75,814	360,102	167,652	2	1	2
Knitting Mills	6	591	3,824	17,701	7,350	15	16	16
Clothing Industries	19	865	5,592	17,531	8,331	16	14	15
Wood Industries	116	2,500	19,185	78,798	40,048	11	10	11
Furniture & Fixture Industries	70	956	7,600	27,312	15,004	12	13	12
Paper & Allied Industries*	17	4,055	43,649	225,105	112,824	5	5	3
Printing & Publishing &								
Allied Industries	143	5,134	53,465	133,788	94,193	8	3	5
Primary Metal Industries	18	2,944	29,070	239,033	59,481	9	9	9
Metal Fabricating Industries	105	4,622	39,484	187,669	81,033	6	4	6
Machinery Industries	20	3,411	31,658	142,848	66,096	7	6	8
Transportation Equipment Inds.	20	834	6,525	24,910	10,679	14	15	14
Non-Metallic Mineral Products								
Industries	56	2,363	25,168	122,407	68,184	9	11	7
Chemical and Chemical Products								
Industries	35	3,218	34,000	228,999	106,699	4	7	4
Misc. Mfg. Industries	85	3,104	26,292	91,519	53,858	10	8	10
Other Major Groups	69	11,767	105,134	596,922	242,707	-	-	-
Total	1,043	64,254	583,482	3,187,051	1,380,889			

*Includes the Pulp & Paper Industry which accounts for \$220 million or 88 per cent of the total value of shipments of the paper and allied industries (Cf. Table in Chapter 15)

Source: Canada, Statistics Canada, Manufacturing Statistics, Sub-Regions, Cat. No. 31-209 (Annual) (Ottawa:1978), Table 1.

TABLE 17.2
Manufacturing Statistics, by County, Eastern Ontario
Planning Region, 1972.

County	No. of Establishments	Total Employees	Salaries and Wages (\$ mill.)	Value of Shipments (\$ mill.)	Value Added (\$ mill.)
Dundas	28	1394	9.4	90.3	37.7
Frontenac	80	5951	53.0	249.6	103.5
Glengary	28	1037	6.1	48.0	14.6
Grenville	31	3217	26.7	199.4	83.1
Hastings	154	9985	68.2	296.6	149.4
lanark	79	3910	24.1	114.7	52.3
Leeds	60	5093	40.4	235.1	85.0
Lennox- Addington	25	2344	17.6	65.0	32.0
Ottawa- Carleton	297	13532	112.0	346.1	174.9
Prescott	44	2039	13.8	66.4	28.6
Prince Edward	32	719	4.4	34.2	17.6
Renfrew	114	5279	33.1	125.9	64.4
Russell	14	73	0.4	5.0	0.9
Stormont	78	6287	48.1	230.2	93.6
Total	964	60,860	457.3	2106.5	937.6

Source: Ontario, Ministry of Economic and Intergovernmental Affairs, Ontario Statistics 1975,
 Vol. 2, Economic Series (Toronto: no date given), pp. 660-661.

in Ottawa depends heavily on federal government offices in the Ottawa-Hull area for a market for its products of sanitary paper. The chemical industry at Cornwall has been developed to meet the demands of the cotton and textile mills, and the pulp and paper industry in the area.

XVII.2 Location of Manufacturing

About 31 per cent of all manufacturing establishments are located in the Ottawa-Carleton Regional Municipality (Table 17.2). Hastings County accounts for another 16 per cent of the total. In terms of employment, the Regional Municipality of Ottawa-Carleton also leads all the counties of the Region. The number of establishments, however, does not give a true picture of the degree of industrialization because it does not take into account the size of the population. Therefore, another measure to determine the degree of industrialization (i.e., number of workers employed in the manufacturing sector per hundred of the population) has been used. By this measure, Ottawa-Carleton is one of the least industrialized areas of the Region. For example, of all the remaining counties of the Region except Russell which is a neighbouring county of Ottawa-Carleton, about five to ten persons out of every 100 inhabitants are working in manufacturing industries. In the Ottawa-Carleton Regional Municipality, only three out of every 100 people work in manufacturing industries. This reflects the dominance of the government sector in the area.

One aspect of industrial development in the Ottawa area, however, is of particular interest. In recent years a number of small and medium-sized high-technology firms¹ have been located in the area - an area which until

¹High-technology firms are a series of new businesses made possible by computerization and miniaturized electronics. High technology is a broad definition describing everything from computers and robots to satellites, genetic engineering and even electronic mail.

recently was viewed as a place of federal bureaucrats. It is no longer a one-industry town, but is now considered as a leader in high technology manufacturing such as telecommunications equipment, electronics, and computer components and services. It is estimated that in the area there are 70 high technology firms (including those providing computer services) which employ 15,000 workers and have an aggregate annual payroll of \$200 million.¹ It is expected that these modern technology-based firms will be employing about 100,000 workers by the end of this decade.

It is not hard to explain the concentration of these firms in the Ottawa area. First, on the supply side, the presence of research and development (R&D) laboratories of the federal government (e.g., National Research Council of Canada, Communication Research Centre, and several federal departments such as Energy, Mines and Resources, Agriculture Canada, and Public Works Canada)² and of the private sector (Bell-Northern Research and Northern Telecom) have proved a great source of high technology information. These laboratories have provided much help to small innovative firms such as Leigh Instruments.³ As well, there are two universities (Carleton, and the University of Ottawa) which provide technical help to these firms. The area, thus, provides an adequate supply of highly-trained scientists and technicians.

Second, on the demand side, the federal government is the single largest buyer of the goods and services produced by these firms. In most cases, the buyers and sellers are in close proximity. This fact reduces the costs of

¹The Financial Post (January 26, 1980), p. 5. According to another recent estimate, there are about 100 high technology firms employing about 20,000 people. See The Citizen (March 24, 1981), p. 49.

²The material testing laboratory run by Public Works Canada has been closed and the Eastern Forest Products Laboratory has recently come under the private sector.

³The Financial Post, op. cit., p. 5.

transportation and information. The federal government's recent procurement policy has also fostered the growth of these high technology firms.

Thirdly, there are certain spin-off feedback or synergism effects, etc. in the high technology sector that act as an incentive for potential firms to locate in the area.

The development of these firms in the area, thus, reflects the spread effects on the manufacturing industries of federal government activities.

Among the other urban centres in the Region, Arnprior, Hawkesbury, Brockville and Cornwall have more than 30 per cent of the work force engaged in manufacturing industries (Table 17.4). Kingston, which is the second largest urban centre of the Region next to Ottawa, has only 12.9 per cent of those gainfully employed in manufacturing industries. Some of the small urban centres such as Carleton Place and Arnprior are highly industrialized, suggesting that the location of manufacturing industries in Eastern Ontario is not necessarily associated with the size of the urban centres, as seems to be the case in Central Ontario.

Eastern Ontario as a whole is also less industrialized than other regions of Southern Ontario. According to the 1971 Census, about 14 per cent of the total population of Ontario inhabited Eastern Ontario while the proportions of all Ontario manufacturing establishments and employment located in the Region were respectively 7.65 and 7.40 per cent. The proportions for value added and gross value of shipment for the Region were respectively 6.67 and 6.13 per cent. In terms of the number of workers employed per 100 inhabitants, the figure was very low, i.e., 5.68. The corresponding figure for Central Ontario was 12.76 and 10.34 for Western Ontario (calculated from population figure and Table 17.3). Average wage

TABLE 17.3

Principal Manufacturing Statistics
by Three Planning Regions of Southern Ontario, 1972
(Current Dollars)

	Eastern Ontario	Central Ontario	Western Ontario	Total Ontario
No. of Manufacturing Establishments (N)	964	9150	1820	12,589
Total No. of Manufacturing Employees (L)	60,860	592,915	122,148	821,614
Salaries & Wages (W) (\$ mill.)	457.3	5018.3	1088.4	6989.8
Value of Shipments (VS) (\$ mill.)	2106.5	24613.5	6752.9	34337.8
Value Added (VA) (\$ mill.)	937.6	10071.4	2326.8	14050.1
(W/L)	7514	8464	8910	8507
(VA/L)	15406	16986	19131	17100
(VA/N (\$ mill.))	0.97	1.10	1.28	1.11
(L/N)	63.13	64.80	67.11	65.26
(VS/N) (\$ mill.)	2.18	2.69	3.7	2.73

Source: Calculated from Ontario Statistics, 1975, Vol. 2, Economic Series, op. cit., pp. 660-661.

rates and value added were also relatively low in Eastern Ontario, and size of establishments was also smaller in the Eastern Region than in the other regions (Table 17.3).¹

Why is Eastern Ontario less industrialized than the other regions of Southern Ontario? Kerr and Spelt² were the first to attempt to explain the location of manufacturing in Southern Ontario. They noted a sharp contrast in the rate of post-World War II industrial growth between Eastern Ontario and other regions of Ontario, and tried to explain this contrast in terms of accessibility to markets and labour. They found that, with the exception of the Toronto Metropolitan area, market potential was inadequate to explain the existing locational pattern of the manufacturing industries in Southern Ontario. In other words, if a manufacturer were guided by considerations of market potential only, he would prefer either Toronto or Montreal and if he decided against either of these two cities, he could, in terms of market potential, equally well select any community in Southern Ontario. If a manufacturer has a very high percentage of his market in both Montreal and Toronto, he will locate his firm in either of these two places but not halfway between them, e.g., in Kingston. It is more expensive to ship 100 pounds by transport truck from Kingston to Montreal and an equal volume from Kingston to Toronto (\$2.88), than to ship 100 pounds from Toronto to Montreal and

¹Economics of scale in manufacturing in all the regions of Southern Ontario were estimated for 1971. Regression results are not reported here because of difficulties in their interpretation. The results indicated constant returns to scale in Eastern Ontario and increasing returns to scale for most of the manufacturing industries in Central and Western Ontario.

²Donald Kerr and Jacob Spelt, "Some Aspects of Industrial Location in Southern Ontario," Canadian Geographer, No. 15 (1960), pp. 12-25.

Montreal to Toronto (\$1.77),¹ constituting a saving of \$1.11 on a 200 pound shipment.

The study found that Eastern Ontario has the same market potential² and even better transportation cost indices than Southwestern Ontario, and it enjoys an added advantage of overnight delivery to both Montreal and Toronto. Therefore, "one would expect this region to support at least as much industry as Southwestern Ontario."³ In reality, this is not the case. Eastern Ontario's share of the total manufacturing output and employment has been declining (Tables 17.7 and 17.8). Neither do labour costs nor labour stability explain the lack of manufacturing industries in Eastern Ontario. Labour costs are lower in almost every major urban centre in Eastern Ontario than those in Southwestern Ontario.

If neither market accessibility nor labour costs explain the lack of manufacturing industries in Eastern Ontario, what then are the effective locational factors?⁴ The study by Kerr and Spelt suggests several non-economic factors that might have influenced the locational pattern of the Region, viz., the attitude of the people toward industry, personal preferences of company officials in locating the plant or firm at one particular site, and accessibility to parent companies in the case of American subsidiaries,

¹Donald Kerr and Jacob Spelt, op. cit., p. 16.

²Market potential has been defined as $P = \frac{M}{d}$ where P is market potential, M, the wholesale trade by county in Southern Ontario, d actual trucking rates per hundred pounds.

³Donald Kerr and Jacob Spelt, op. cit., p. 16.

⁴See "Industrial Profile" of major urban centres in Eastern Ontario, in Ontario, Ministry of Industry, Trade and Tourism, Industrial Survey, 1975. Also Table III in Kerr, and Spelt, op. cit., p. 14.

but the study did not test the significance of these factors and thus their importance is not established.

Another study by Ray has dealt with the problem of regional variation in industrial location in Southern Ontario.¹ His analysis indicated that market potential serves in large measure to explain the location of locally controlled firms; while "economic shadow"² largely explains the location of American-owned branch plants. According to his analysis, an Eastern Ontario centre suffers from economic shadow whenever Toronto intervenes between it and an American industrial centre. Its economic growth is retarded by its inability to attract American branch plants which tend to be located in Central or Western Ontario, near their parent companies.

Neither of these studies interprets the present-day distribution of manufacturing in Eastern Ontario in an historical context nor do they deal with the dominance of government activities in Eastern Ontario. As is clear from the history of manufacturing industries in Eastern Ontario, the present pattern of manufacturing location was determined in the second half of the nineteenth and the early part of the twentieth century. At the close of the nineteenth century, the centres that had experienced a boom during the heyday of the timber and lumber trades were declining. With the development of Toronto as the commercial, financial, and industrial centre of Ontario and the

¹M.D. Ray, Market Potential and Economic Shadow, Department of Geography Research Paper No. 101 (Chicago: University of Chicago, 1965).

²The concept of "economic shadow" refers to the idea that the likelihood of a manufacturer establishing a branch plant in a city is inversely proportional to the city's distance from the manufacturer. The primary element of economic shadow is sectoral affinity according to which a branch plant tends to locate in the area lying between the head office and the primary market centre of the region. The area beyond the sectoral affinity is said to suffer from economic shadow. See M.D. Ray, "Urban Growth and the Concepts of Functional Region," in N.H. Lithwick, et al., Urban Studies: A Canadian Perspective (Toronto: Methuen, 1968), pp. 40-91.

expansion of railways and steam power, the focus of manufacturing activity moved to Central and Western Ontario. Some of the old industries of Eastern Ontario (viz., cotton textiles, wood-using industries, etc.), however, continued to exist even under these changed circumstances. Major urban centres such as Belleville, Cornwall, and Kingston experienced a decline in manufacturing growth (See the Appendix). Ottawa and Brockville were among few centres that gained in manufacturing employment. Ottawa's share in the Region's total manufacturing employment and gross output increased from 19.25 per cent and 20.6 per cent, respectively in 1891 to 27.35 per cent and 26.6 per cent in 1911.¹ The rapid growth of manufacturing activity in Ottawa was owing to the expansion of printing and publishing firms to meet the federal demand for stationery, books, paper, etc.. The food and beverage industries also expanded to serve the growing population of Ottawa, the national capital. In spite of this, Ottawa cannot be considered as an industrial town, as its economy is still dominated by the federal government's activities.

Some centres (e.g., Trenton, Napanee, Almonte, Arnprior and Carleton Place) which had been prominent during the early part of the second half of the nineteenth century, could not maintain their prominence as manufacturing centres. The pull of large urban centres (mostly those in Central Ontario such as Toronto and its surrounding towns) and the fact that the railways by-passed some of the small centres were the two most important factors that contributed to their decline. Even if railways did pass through them, bigger firms in nearby railway-linked centres provided severe competition to the smaller firms located

¹ High growth rate between 1891-1911 seems to be due in part to changes in the census coverage in 1901 and 1911. See footnote on Table 17.5 for specific changes in the coverage.

TABLE 17.4

Percentage Distribution of Employment by Industry, Major Urban Centres of Eastern Ontario Planning Region, 1971

	Primary Industries	Total Manufacturing	Construction	Transport & Communication Utilities	Trade	Fin. Ins. Real Est.	Comm. Bus. Per. Services	Pub. Admin. Defen.	Un-de-fined
Almonte	2.4	28.6	7.0	5.2	11.5	3.8	20.2	15.7	5.6
Arnprior	0.8	37.9	5.6	6.3	13.2	2.3	19.2	6.5	8.6
Brockville (Total area)	3.6	34.7	3.9	5.6	14.5	2.7	23.3	5.4	6.5
Cornwall Area	4.0	50.4	4.9	6.3	13.9	2.6	24.6	5.4	8.2
Bancraft	0.7	7.8	9.2	5.9	24.8	5.2	32.0	9.8	3.3
Carleton Place	0.7	33.6	4.4	5.6	17.9	3.0	21.7	8.2	4.7
Hawkesbury	0.4	37.0	4.4	2.6	16.8	2.6	22.0	3.9	10.6
Pembroke	1.5	11.0	3.8	5.5	14.3	2.2	38.0	15.5	8.1
Kingston Area	0.9	12.9	6.0	4.8	12.8	3.6	38.8	12.4	7.8
Renfrew	1.1	23.8	4.5	8.9	17.1	3.3	25.2	8.9	8.1
Smith Falls	0.3	16.2	2.7	12.9	15.6	2.5	37.3	6.1	6.0
Ottawa Metro (Ontario Part)	1.0	6.4	4.9	6.1	12.1	4.6	25.1	32.3	-

Sources: (1) Ontario Ministry of Treasury, Economics and Intergovernmental Affairs, Regional Planning Branch, Special Tabulation.

(2) Canada, Statistics Canada, 1971 Census of Canada, Ottawa-Hull, Census Tract Bulletin, Cat. No. 95-745, (Ottawa, 1974), Table 2.

in areas that no longer had any special advantages, notably Almonte, Arnprior, Carleton Place, Picton, etc.. Thus, the coming of railways, steam power, coal and iron seem to have stripped the small urban centres in Eastern Ontario of their natural advantages in water power and water transportation. Furthermore, the decline of sawmilling and the elimination of the square-timber trade also contributed to the decline of these centres. To understand why the manufacturing sector of Eastern Ontario lags behind that in other regions of Ontario, therefore, one must view its development in the nineteenth century. With the exception of a few high technology industries, and pulp and paper industry, the Region has continued to specialize in traditional low productivity and low growth industries.

XVII.3 Total Manufacturing Growth

The manufacturing activity of the Region in the early twentieth century was recovering from the recession of the 1880's and 1890's. The value added of its manufacturing increased by 75 per cent between 1901 and 1911¹ (See Table 11.2 and 17.5). The number of manufacturing establishments employing five workers or more increased by only 12.8 per cent. This means that the process of integration and amalgamation of manufacturing industries that had started at the close of the nineteenth century, continued in the early twentieth century. Though the statistics for manufacturing establishments employing less than five workers are not available for 1911, the national statistics provided by the 1905 Postal Census also indicate that the process of amalgamation of firms was in operation. The number of manufacturing firms employing 5 workers or more declined from 19,650 in 1901 to 12,547 in 1905, though the value of output in current dollars had risen almost by 60

¹ The manufacturing statistics for 1911 are almost comparable with those of 1901. The manufacturing census of 1911 reported returns of certain establishments employing less than five workers, which were not reported by the 1901 Census. But the increase in total manufacturing output reported by the 1911 Census amounted to only 1.52 per cent more than what would have been in the absence of the change. See Fifth Census of Canada 1911, Vol. III, p. vii for the basis of 1.52 per cent and also see footnote on page 237.

TABLE 17.5

Manufacturing Statistics, Eastern Ontario Planning
Region, for Selected Years in Constant (1935-39) Dollars

	1911	1932	1952	1972
No. of Establishments % of Ontario	1,969 24.60	1,834 19.51	1,692 12.84	964 7.65
Total Manf. Employees % of Ontario	34,424 14.41	25,851 11.12	47,660 7.81	60,860 7.40
Wages and Salaries % of Ontario	\$22,889,957 19.54	28,466,352 10.10	49,623,860 6.72	147,373,470 6.54
Value Added % of Ontario	\$41,288,521 14.63	34,123,958 5.72	60,757,120 6.37	302,150,130 7.28
Value-Added Per Establishment	\$ 20,970	15,521	35,908	152,877
Value Added Per Employee	\$ 1,169	1,320	1,275	4,964
Wages and Salaries Per Employee	\$ 665	1,101	1,041	2,421

Sources: (1) Canada, Census's Office, Fifth Census of Canada, 1911, Vol. III (Ottawa: Printer to the King's Most Excellent Majesty, 1913), pp. 234-289.

(2) Canada, Dominion Bureau of Statistics (now called Statistics Canada), The Manufacturing Industries of Canada, 1932, Summary Report (Ottawa: Printer to the King's Most Excellent Majesty, 1935), pp. 78-79.

(3) Canada, Statistics Canada, Manufacturing Industries of Canada, Geographical Distribution, 1952-1972, Cat. No. 31-209; and Price and Price Statistics, 1951-1952, Dominion Bureau of Statistics, Cat. No. 62-009 (Ottawa, 1953), Table 17, pp. 24-26.

Note: The Census of 1911 like that of 1901 recorded returns for establishments with five workers or more but the 1911 figures unlike those for 1901 included not only butter and cheese factories employing less than five workers but also included flour and grist mills, sawmills, shingle making, etc. that employed less than five workers. However, the difference in coverage in terms of output between the two censuses amounted to only 1.52 per cent.

per cent over the period.¹

Census data are not available at the county or census division level for 1911-1931, so it is impossible to tell how great the increase in manufacturing activity was in the Region between 1914 and 1918. Some idea of the increase can, however, be formed by looking at the figures for Ontario as a whole. Manufacturing employment in Ontario increased by 25.36 per cent between 1910 and 1917, and reached a maximum in 1919.² The manufacturing growth of the Region during the period between the Wars was seriously disrupted by the depression of the 1930's. In 1932, regional manufacturing employment was 25,851, down 24.85 per cent from its level in 1911 (Table 17.5).

The industrial development of the Region revived after 1937, but the share of the Region in the total manufacturing activity in Ontario continued to decline. The Region's share of all manufacturing employment in Ontario declined from 11.12 per cent in 1932 to 7.81 per cent in 1952, although the Region's manufacturing value added and employment rose respectively by 78.05 and 84.36 per cent during the same period.³ This increase in total value added and employment was accompanied by a decline in the number of establishments, real wages per employee, and value added per employee.

¹Canada, Census's Office, Fifth Census of Canada 1911, Vol. III (Ottawa: Printer to King's Most Excellent Majesty, 1913), p. iv.

²Calculated from Canada Year Book for Various Years.

³Ibid;

As the depression was already established by 1932, a year before its onset (i.e., 1929) would have provided an ideal comparison, but the unavailability of data for that year makes it impossible.

The manufacturing sector of Eastern Ontario showed a relatively rapid growth between 1952 and 1972. During this period, value added in real terms grew by about 400 per cent from \$60.78 million in 1952 to \$302.16 million, compared with a 78 per cent increase over the period 1932 to 1952. Real wages and salaries per employee increased by about 132 per cent, while value added per employee recorded a rise of 289 per cent. This wide difference in percentage growth rates between value added and wages or salaries per employee may represent a significant rise in labour productivity. This rise is hard to interpret in the absence of capital data. Value added per establishment recorded an increase of 325 per cent between 1952 and 1972, compared with 131 per cent between 1932 and 1952. In spite of these growth rates, the Region lost its share of total Ontario manufacturing establishments - a decline from 12.84 per cent in 1952 to 7.65 per cent in 1972. The corresponding figures for the total number of employees in manufacturing were 7.81 and 7.40 per cent, respectively. Value added and wages and salaries per employee are lower in Eastern Ontario than in Central and Western Ontario (Table 17.3). The average size of firms (measured both in number of employees and the value added per establishment) is also lower in Eastern Ontario than in Central and Western Ontario.

In the post-World War II period, the pattern of manufacturing industries in the Region did not change significantly, but recently the Region has attracted many high-technology firms. However, it still mainly relies on traditional low-productivity industries such as cotton textiles. The shift from an "unfavourable" mix of industries to modern highly-innovative industries is a very slow process.

XVII.4 Patterns of Manufacturing Growth - A Shift and Share Analysis

A shift and share analysis has been used to demonstrate that the pattern of manufacturing growth has not changed significantly since the post-war period.

The analysis will also identify the sectors responsible for the higher or lower than average growth rate of the Region and counties, the industries responsible for different sectoral behaviour, and the ultimate factors responsible for these changes.

- The present study has selected two periods to determine the trend in the growth pattern of the various counties: 1949 to 1959, and 1961 to 1970. This selection is based purely on availability of data.

The Shift and Share Technique

The shift/share technique originally created by Creamer in 1943 has been widely used in analysis of regional economic growth for the last 35 years.¹ The technique is based on the idea that regional development takes place in a national framework and depends in part upon forces operating at the national level. It assumes that all regions grow at the national growth rate and deviation from that growth rate represents the region's loss or gain. Changes at the national level affect regions differently because of the composition of their outputs. The operation of these national

¹See, for example, Benjamin H. Stevens and Craig L. Moore, "A Critical Review of the Literature on Shift-Share as a Forecasting Technique," Journal of Regional Science, Vol. 20, No. 4 (1980), pp. 419-437. Daniel Creamer, "Shift of Manufacturing Industries," in Industrial Location and National Resources (Washington, D.C.: U.S. National Resource Planning Board, 1943). L.D. Ashby, "The Shift and Share Analysis: A Reply," The Southern Economic Journal, No. 3, 1968, pp. 423-425. Victor Fuchs, Changes in Location of Manufacturing in the United States Since 1929 (New Haven: Yale University Press, 1962). David B. Houston, "The Shift and Share Analysis of Regional Growth: A Critique," The Southern Economic Journal, No. 4 (April 1967), pp. 577-81. Harvey Perloff, Edgar Dunn Jr., Eric Lampard and Richard Muth, Regions, Resources and Economic Growth (Baltimore: Maryland, The Johns Hopkins Press, 1960). Edgar Dunn, Jr., "A Statistical and Analytical Technique for Regional Analysis," Papers, Regional Science Association, Vol. 6 (1960), pp. 97-112. J.R. Lausen, "Venezuela: An Industrial Shift-Share Analysis 1941-61," Regional and Urban Economics, Vol. 1 (1971), pp. 153-193. C.P. Paraskevopoulos, "Patterns of Regional Economic Growth," Regional and Urban Economics, Vol. 4 (1974), pp. 75-105. Canada, Statistics Canada, Growth Patterns in Employment 1949-1959, 1961-1970, Cat. Nos. 31-305, 31-518 (Ottawa: The Queen's Printer, 1969, 1973).

forces is modified by some regional factors. A region may experience rapid growth either because of its favourable distribution of industries whose national growth rate is higher than aggregate national growth rate or because of its competitive position due to industries that grow faster at the regional level than at the national level. These two types of forces have been identified in the literature by various names. Following Statistics Canada's classification, we name them

(1) Industry Mix

(2) Regional Share.

These two forces may be responsible for the divergence of a Region's growth rate from the national growth rate. To understand the divergence, one must consider the two components. First, the industrial composition of a given area must be examined to determine whether the industries located there have slow or fast employment growth. Where the individual industry's employment growth rate differs from the national average growth rate of all manufacturing employment, the industry mix in an area will partially explain the deviation from national growth. Secondly, the growth rate of a region may diverge from the national growth rate because it has obtained an increasing or decreasing share of employment in some industries. Therefore, if an industry in a region grows at a rate faster than the national employment growth rate for that industry, it would have a positive regional share, while a smaller-than-average growth rate would result in a negative regional share.

The combined effect of industry mix and regional share in an area is the net relative change which describes the total divergence in regional employment growth rate from the national growth rate. It is possible that both components of net relative change may be positive or negative or one negative and the other positive. The following equation indicating both components has been

used in the shift and share calculations.¹

Net Relative Change² = Industry Mix + Regional Share

$$\Sigma\{(E_{ij}^t - E_{ij}^1) - (E_{ij}^1 \times r)\} = \Sigma E_{ij}^1 \times (r - r_i) + \Sigma\{E_{ij}^1 \times (r_{ij} - r_i)\}$$

where

E_{ij}^1 = employment in industry i in county j for the base year

E_{ij}^t = employment in industry i in county j for subsequent year t.

r = national growth rate for all industries to year t

$$= \frac{\Sigma \Sigma (E_{ij}^t - E_{ij}^1)}{\Sigma \Sigma (E_{ij}^1)}$$

r_i = national growth rate for industry i to year t

$$= \frac{\Sigma (E_{ij}^t - E_{ij}^1)}{\Sigma (E_{ij}^1)}$$

r_{ij} = growth rate of industry i in county j to year t

$$= (E_{ij}^t - E_{ij}^1) / E_{ij}^1$$

Results

The shift and share analysis reveals that Eastern Ontario has an unfavourable industry-mix as compared with the Province of Ontario. It shows that with the exception of Leeds, all the counties or census divisions had figures for the industry-mix below the provincial figure for the period 1949-1959 (Table 17.7).

The situation was very much the same during 1961-1970. Thus, it is apparent that the Region has failed to attract fast growing manufacturing industries (Table 17.8), except a few high-technology industries.

¹Canada, Statistics Canada, Growth Patterns in Manufacturing Employment 1961-1970, Cat. No. 31-518 (Ottawa: Information Canada, 1973), p. viii.

²Since net relative change is the difference between the actual growth of the region's employment and the expected growth had the region grown at the national growth rate, then by definition the equation can be written in the revised form: Region's Employment = National Share + Industry Mix + Regional Share.

With regard to the regional share, Eastern Ontario did somewhat better. With the exception of a few counties (Frontenac, Hastings, Lanark, Prince Edward and Carleton), all the counties had a percentage regional share above the provincial average.

Among the industries that contributed most to the regional share were:

Dairy Factories, Bakeries, Feed Industries
 Communications
 Transportation Equipment
 Pulp and Paper Mills
 Cotton Yarn and Cotton Mills
 Miscellaneous Machinery and Equipment.

With the exception of transportation equipment, communication equipment, and miscellaneous machinery and equipment, all these industries were slow-moving. Their growth rate was less than the "all manufacturing" growth rate at the national level. To show the trend in the pattern of industrial employment, the two major components of employment change have been classified into four categories according to various combinations of industrial mix and regional share components of net relative change. There are four possible combinations.

<u>Regional Categories</u>	<u>Industrial Mix</u>	<u>Regional Share</u>
1	+	+
2	+	-
3	-	+
4	-	-

Explanation of the Regional Categories

The first category consists of areas that gain in employment on the basis of both industrial mix and regional share. The combined effect of both components would be rapid economic expansion of the area.

The second category relates to cases where a region gains in terms of industrial mix but loses in regional share; that is, an area attracts some fast growing industries but loses offsetting amounts of industrial employment

in slow-moving industries at the regional level. The overall result is typically a growth rate close to the average.¹ This growth pattern is generally found in the larger population areas which are highly diversified and rich in industrial composition, but their growth is dampened by spinning off the growth effects of industries.

The third category relates to an area that loses in terms of industrial mix but gains in regional share. This situation is typical of medium and smaller size urban centres which grow mainly by acquiring and expanding slowly growing or declining industries.

The last category represents the situation where an area is losing on both accounts. It is the case of a depressed area.

The following Table shows the industrial structure of manufacturing employment in Eastern Ontario according to these classifications:

TABLE 17.6

Number of Counties With Various Mix-Share Situations
1949-1959, 1961-1970

Situation (1)	Mix (2)	Share (3)	1949-1959 No. of Counties (4)	1961-1970 No. of Counties (5)	Change (6) = (5) - (4)
1	+	+	2	1	-1
2	+	-	1	3	2
3	-	+	6	5	-1
4	-	-	5	5	0
TOTAL			14	14	0

¹Wilbur Thompson, A Preface to Urban Economics (Baltimore: The Johns Hopkins Press, 1965), p. 56.

Table 17.6 indicates that the number of counties with both a better industry mix and a higher regional share declined by one between the two periods considered. On the other hand, the number of counties with improved industrial mix and poor regional share increased by one between the two periods; while the number of counties that deteriorated both in terms of industry mix and regional share remained the same. Thus, in total, there seems to be little improvement in the relatively depressed counties of Eastern Ontario. Since all the counties with negative mix in 1949-1959 (i.e., Carleton, Lanark, Stormont, Prince Edward and Frontenac) and in 1961-1970 (i.e., Carleton, Russell, Grenville, Prince Edward and Frontenac) are not the same, results could be interpreted as minor improvement in 1961-1970 over 1949-1959 as Lanark and Stormont counties are bigger in population than Russell and Grenville.

As suggested above, comparative analysis of the number of counties with various combinations of industry mix and regional share over these two periods cannot give a true picture of the employment changes in the Region because the counties differ in size. One needs employment figures on industrial mix and regional share for the whole region to know whether the Region's relative situation has improved, deteriorated or remained the same over two periods. This information is provided in Tables 17.7 and 17.8.

Tables 17.7 and 17.8 indicate that manufacturing employment in Eastern Ontario increased in both periods (1949 to 1959; 1961 to 1970). The increase, however, cannot be attributed to the growth of the manufacturing sector at the national level. For example, the period 1949 to 1959, regional manufacturing employment increased by 1,369 (2.9 per cent). If the Region's manufacturing employment had grown at the national rate (i.e., 10.6 per cent), 4,917 additional jobs would have been created. Thus, the Region's manufacturing

TABLE 17.7
Components of Employment Change in Manufacturing
Employment for Counties in Eastern Ontario Region
1949-59

County or Census Division	Manufacturing Employment		Change Numerical %	National Growth	Net Relative Change		Components of Net Relative Change		
	1949	1959			Numerical %	%	Industry Mix Numerical %	Regional Share Numerical %	%
Dundas	650	744	94 14.5	69	25	3.9	-14.7	-22.6	172 26.5
Frontenac	5705	5337	-368 -6.4	606	-974	-17.1	-553	-9.2	-421 -7.4
Glengarry	315	271	-44 -14	33	-77	-24.6	-106	-33.7	29 8.9
Greenville	1408	2522	1114 79.1	150	964	-68.5	-33	-2.3	997 70.8
Hastings	7183	7988	805 11.2	764	41	0.6	1803	25.0	-1762 -24.5
Lanark	3679	2613	-1066 -29.0	391	-1457	-39.6	-935	-25.4	-522 -14.2
Leeds	2744	4072	1328 48.4	292	1036	37.8	139	5.7	897 32.7
Lennox & Addington	854	1516	662 77.5	91	571	66.9	-44	-5.1	615 72.0
Prescott	887	1121	234 26.4	96	140	15.8	14	1.6	126 14.1
Prince Edward	785	726	-59 -7.5	83	-142	-18.1	-58	-7.3	-84 -10.8
Renfrew	3709	3973	264 7.1	394	-130	-3.5	-519	-14.0	389 10.5
Russell	225	193	-32 -14.2	24	-56	-24.9	-64	-28.5	8 3.7
Stormont	6833	6047	-786 -11.5	726	-1512	-22.1	-917	-13.4	-595 -8.7
Carleton	11416	10639	-777 -6.8	1214	-1991	-17.4	-196	-1.7	-1795 -15.7
Eastern Ontario	46393	47762	1369 2.9	4931	-3562	-7.7	-1616	-3.6	-1946 -4.2
Ontario	551624	605898	54274 9.8	58641	-436.7	-0.8	5942	1.1	-1030.9 -1.9

Source: Canada, Dominion Bureau of Statistics, Growth Patterns in Manufacturing Employment by Counties and Census Divisions, 1949-1959/1961-1965, Cat. No. 31-503, Occasional (Ottawa: The Queen's Printer, 1969), pp. 32-37.

TABLE 17,8

Components of Change in Manufacturing Employment in the Eastern
Ontario Planning Region by Counties and Census Divisions, 1961-1970

County or Census Division	1961	1970	Change		National Growth	Net Relative		Components of net Relative Change	
			Numerical	%		Numerical	%	Industry Mix Numerical	Regional Share Numerical
Dundas	884	1297	413	46.7	171	242	27.4	-229	471
Frontenac	6055	5706	-349	-5.8	1174	-1523	-25.2	-146	-1377
Glengarry	657	1015	358	54.5	127	231	35.2	-142	373
Grenville	2929	3366	437	14.9	568	-131	-4.5	-44	-86
Hastings	8010	9065	1055	13.2	1553	-498	-6.2	193	-691
Lanark	2760	3889	1129	40.9	535	594	21.5	-341	935
Leeds	3943	5087	1144	29.0	764	320	9.6	406	-26
Lennox & Addington	1497	2260	781	52.8	287	494	33.4	37	457
Ottawa Carleton	12107	12854	747	6.2	2347	-1600	-13.2	-442	-1158
Prescott	1089	1840	751	69.0	211	540	49.6	-46	586
Prince Edward	782	789	7	.9	152	-145	-18.5	-107	-38
Renfrew	4388	5123	735	16.8	851	-116	-2.6	-203	87
Russell	188	140	-48	-25.5	36	-84	-44.7	-28	-56
Stormont	5165	6242	1077	20.9	1001	76	1.5	231	-155
Eastern Ontario	50436	58673	8237	16.3	9777	-1540	-3.0	-861	-679
Ontario	620638	774286	153648	24.8	120326	33322	5.4	36944	-3623

Source: Canada, Statistics Canada, Growth Patterns in Manufacturing Employment, 1961-1970, Cat. No. 31-518
Occasional, (Ottawa: Information Canada, 1973), pp. 42-53.

growth rate fell short of the manufacturing growth rate at the national level by 3,562 workers, of which 1,676 can be attributed to the unfavourable industry mix and 1,950 to a low regional share.¹ The situation was similar in the period 1961 to 1970 but with a marginal difference, i.e., the levels of negative components of industry-mix and regional share were lower than those in the period 1949 to 1959.

The findings of the above analysis show that during the years 1949-1970, the pattern of manufacturing industries in the Region did not change significantly, although recently the Region has attracted several computer and electronic firms. It still mainly relies on traditional low-productivity industries such as cotton textiles. The shift from an "unfavourable" mix of industries to modern highly innovative industries is a very slow process.

Limitations of the Shift/Share Technique

Apart from confusion over terminology, the shift/share technique has been criticized on several counts.² Most of the criticism of the technique is concentrated on its mechanical nature and its inability to explain behaviourally its various components, its assumption that an industry in the Region should grow at the same rate as its national counterpart does, and the assumption of constant shift or share in applications of the technique in forecasting. The critics of the technique also point out that its results are valid only if all goods produced by industries are sold in the national market - an implicit assumption of the technique.

¹ Figures may not agree with total due to rounding.

² See B.H. Stevens and C.I. Moore, op. cit., pp. 419-437, and D.B. Houston, op. cit., pp. 577-581, for the various terminologies used, the basic issues involved, the critical evaluation, and alternative formulations of the shift/share technique.

Without discussing these and other points of criticism in detail, it may be pointed out that for the purpose of this study, some of these points do not have much weight. Our aim in using the technique is not to forecast regional employment, but rather to explain ex-post the performance of the manufacturing sector of the Region. In this connection, Stevens and Moore remark:

"Shift-Share still seems to have some value in serving its original purpose of making ex-post analysis of the components of regional employment change. Admittedly, the question of structural change and some issues raised by various authors create doubts about the correct interpretation of the various shift components.... Nevertheless, shift-share is unrivaled in its ability to provide quick, inexpensive, and useful indications of past regional performance and to identify problems which may deserve the attention of public policy-makers or may require further study."¹

In Canada, the usefulness of the technique may not be as great as it is thought to be by Stevens and Moore because of the non-homogeneous nature of the economy. But certainly, the technique is useful in comparing the growth patterns of various regional sectors within a national framework and under certain assumptions.

XVII.5 Spatial Pattern of Industrial Linkages in Eastern Ontario

The amplifying effects of growth impulses emanating from one urban centre to another depends, to a large extent, on the spatial pattern of industrial linkages among various centres. There have been a very few attempts in the literature to examine the spatial pattern of inter-firm linkages in a region to determine the impact on the region of development policy. Most of the studies undertaken are concerned mainly with viability of the policies

¹B.H. Stevens and C.I. Moore, op. cit., p. 433.

TABLE 17.9
Percentages of Reporting Firms Making Purchases of Factors from Various Centres

Centre Factor	Local Area	Other City in Eastern Ont.	Ottawa/ Hull	Toronto	Montreal	Elsewhere in Canada	Outside Canada
Employment	79.54	6.81	-	11.36	11.36	25.00	6.18
Raw Material	50.00	22.72	-	75.00	65.90	63.63	61.36
Equipment	56.82	18.18	-	63.63	45.45	38.63	47.72
Final Goods	50.00	27.27	-	63.63	47.72	70.45	43.18
Construction Firms	52.77	-	19.44	25.00	36.11	11.11	2.77
Consulting Services	28.12	-	25.00	56.25	31.25	6.25	3.25
Finance	34.11	-	20.58	32.55	20.58	0.0	5.88
Insurance	48.83	-	11.62	30.23	23.25	0.0	11.62
Recreation Sophisticated	66.67	-	17.95	10.25	25.64	28.20	25.64
Shopping	78.95	-	50.00	26.31	26.31	7.89	10.52
Holidays	75.61	-	12.19	12.19	12.19	68.29	60.97
Average	56.48	18.74	22.39	36.92	31.43	29.04	25.37

Source: Compiled from answers to the Questionnaire.

of industry movements and the possibilities of promoting movements from the conurbation.¹

The purpose of this section is to determine the extent to which the main centres in Eastern Ontario are spatially and industrially linked together. The following questions have been asked and answered to determine these linkages: To what extent do firms in the urban centres in Eastern Ontario make use of raw materials and industrial and consulting services from within the Region (backward linkage)? To what extent do firms in the urban centres in the Region sell their intermediate products within the Region (forward linkage)? To what extent do firms in the Region hire workers from within the Region? Do the workers (including managers and owners) commute from places other than the work area? Do members of senior management staff go to other urban centres for their sophisticated shopping?

Sources of Data: Published data proved to be inadequate to answer the above questions. So a questionnaire and personal interviews were used. The questionnaire was mailed to firms in the main urban industrial centres in Eastern Ontario in the first week of July 1976. Personal interviews with the industrial commissioners of the various urban centres were conducted in September-October 1974. The following centres were visited: Kingston, Belleville, Pembroke, Brockville, Smiths Falls, Perth, Renfrew, Arnprior and Gananoque.

The questionnaire was divided into three sections. Section A dealt with names, addresses and general information relating to products and the

¹There is however, one recent study that deals with the spatial linkages of firms. See J.M. Moseley, "The Impact of Growth Centres in Rural Regions-II, An Analysis of Spatial "Flows" in East Anglia," Regional Studies, Vol. 7, (1973), pp. 77-94.

existence of firms. Section B was concerned with employment and journey to work. Section C related to markets, materials, expenditure on certain services and factors in industrial location. Industrial establishments in the Region were taken from Scott's Industrial Directory, Ontario Section, 1975 Edition. The establishments were classified in two categories: those employing less than 10 workers, and those employing 10 workers or more. As a large part of industrial output and employment is accounted for by firms employing 10 workers or more, questionnaires were mailed only to them. The results are biased by the neglect of the small firms, but this did not impair their usefulness.

In all, 140 questionnaires were mailed, 44 replies were received, constituting a response rate of 31.42 per cent. The centres to which questionnaires were mailed were: Ottawa, Kingston, Belleville, Brockville, Cornwall, Pembroke, Smiths Falls, Arnprior, Hawkesbury, Carleton Place, Perth and Bancroft. The results based on the 44 replies received are shown by Table 17.9.

Findings by Factors

Employment and Journey to Work

The total number of workers (including managerial and owner-workers) in 44 respondents was 11,162. Out of these, 7,774 (69.67 per cent) were commuting from places more than 10 miles from the work place.

Sources of Capital Equipment

Toronto was the main supplier of capital equipment to firms in Eastern Ontario. Of all reporting firms, 63.63 per cent bought more than 70 per cent of their capital equipment from Toronto. The 'Local area' (i.e., individual

centres in Eastern Ontario) provided capital equipment to 56.82¹ per cent of the reporting firms. 'Outside Canada' and Montreal were mentioned as a source of capital equipment by 47.72 per cent and 45.45 per cent of the sample firms, respectively. 'Elsewhere in Canada' accounted for 38.63 per cent of the reporting firms and only 18.18 per cent of the firms mentioned 'other city in Eastern Ontario' as a source of capital equipment.

Market for Final Goods

Firms located in Eastern Ontario supplied goods and services mostly to markets falling in the category 'elsewhere in Canada', as 70.45 per cent of the reporting firms sold their final goods and services in 'other places in Canada'. Toronto provided a market for final goods and services to 63.63 per cent of the reporting firms. The 'Local area'² provided a market to 50 per cent of the firms. The respective figures for Montreal and 'outside Canada' were 74.72 per cent and 43.18 per cent. The category 'other city in Eastern Ontario' provided a market to only 27.27 per cent of the reporting firms.

Major Construction Firms

A majority of the reporting firms (56.25 per cent) hired the services of construction firms located in the 'local area'. Montreal accounted for 26.11 per cent of the reporting firms. Toronto supplied construction services to 25 per cent of the reporting firms. Ottawa/Hull provided construction services to 19.14 per cent of the reporting firms and 11.11 per cent and 2.77 per cent of the reporting firms went elsewhere in Canada and

¹Percentage may exceed 100 since some firms may have more than one source of supply.

²Local area means local municipality or regional municipality in the Region.

outside Canada for these construction services, respectively. Sixteen per cent of the sample firms did not require services of construction firms.

Consulting Services

Consulting services were not required by 17.3 per cent of the responding firms. Of the remaining firms, 56.25 per cent hired consulting services from Toronto, 31.25 per cent from Montreal, 28.12 per cent from the 'local area', 6.25 per cent from 'elsewhere in Canada' and 3.25 per cent from 'outside Canada'.

Large Scale Finance

Firms in Eastern Ontario do not necessarily raise their funds in Toronto or Montreal. They borrowed a large portion of their funds from national Chartered Banks through their local branches. The survey indicates that 34.11 per cent of the reporting firms borrowed funds from the local area, 32.35 per cent from Toronto, 20.58 per cent from Ottawa-Hull, 5.88 per cent from 'outside Canada' and none of the firms borrowed funds from the source 'elsewhere in Canada'.

Insurance for Plant and Equipment

Insurance services, like large scale finance, are provided to firms through local sources and, again, branches of national companies. Nearly half of the reporting firms bought their insurance services locally, 30.23 per cent from Toronto and 23.35 per cent from Montreal. Ottawa/Hull and 'outside Canada' supplied the same percentage, i.e., 11.62. None of the reporting firms bought insurance services from 'elsewhere in Canada'.

Recreational Facilities

Big cities in Ontario and Quebec do not attract members of management for recreational facilities. Management personnel in the majority of firms

(66.67 per cent) stay in the local area for their recreational facilities. Next to 'local area' is the category of 'elsewhere in Canada' (28.2 per cent). Members of management staff in Eastern Ontario prefer to go elsewhere in Canada for their recreational activities rather than to Toronto, Montreal and Ottawa/Hull. The percentage of the firms whose members go to Toronto, Montreal and Ottawa/Hull for recreational facilities are 10.25, 25.74 and 17.95, respectively.

Sophisticated Shopping (The purchase of T.V. sets, furniture etc.)

Senior members of management in a majority of the firms (78.75 per cent) do their sophisticated shopping in the local area. Members of nearly half of the firms do their sophisticated shopping in Ottawa/Hull. Toronto and Montreal are tied with an equal percentage of 28.6. The categories of 'elsewhere in Canada' and 'outside Canada' serve only 7.89 per cent and 10.52 per cent of the reporting firms, respectively.

Holiday Resorts (Recreation)

The general staff of 75 per cent of the reporting firms chose local areas as a holiday resort; 68.29 per cent of them chose 'elsewhere in Canada'. Ottawa/Hull, Montreal and Toronto all were tied at 12.19 per cent.

Factors in Locational Decisions

Seven locational factors were listed in the questionnaire. Some of the replies received (27.95 per cent) gave locational factors other than those listed. Among those listed, low price of industrial land was significant to 25 per cent of the reporting firms; attractiveness of the city was important to 21.95 per cent; incentives provided by the Provincial and Federal Governments were a locational consideration for 12.18 per cent; and familiarity with the city was important to 10 per cent and municipal grants were important factors

in the case of 5 per cent of the reporting firms.

Findings by Centres

The importance of each of the centres is considered in relation to 11 factors. It may be noted that the percentages along rows add up to more than 100 because the responding firms derived supplies from more than one place. Percentages along columns are added together and the mean average is calculated. In the absence of information as to the relative weight of each of the 11 factors, equal weight is given to each of them in the calculation of the average for each centre. More than half of the firms in the survey depend upon their local economies for various inputs and facilities such as employment, equipment and raw materials. Also the staff of more than half of the firms looked to 'local area' for recreation and shipping services. Toronto is a dominant centre catering to the needs of 36.92 per cent of the firms. Montreal serves 31.42 per cent of the firms for their various needs and is immediately followed by 'elsewhere in Canada'. Ottawa/Hull serves only 22.39 per cent of the firms. The standings of 'outside Canada' and 'other city in Eastern Ontario' are 25.37 per cent and 18.14 per cent, respectively.

From the above percentages, it seems that there is not very much industrial linkage among firms located in different Centres in Eastern Ontario. Most of them carry on activities whose impacts are felt either outside the Region or to a limited extent in the local areas. These effects are not transmitted from one local area to other parts of the Region. Toronto is the centre on which the firms largely depend for their supplies. It still continues to exert a great influence on the Eastern Ontario economy. The Ottawa/Hull area is weakly linked with other areas in the Region.

This has two important implications for the industrial development strategy for the Region:

1. No effort to industrialize the Region will have any significant impact on the Region unless some linkages are created among industries located in the Region.
2. Firms in the Region depend for various types of their requirements either on their local economies or on centres outside the Region but not on other centres within the Region. This means that the multiplier or spread effects will either stay only in a particular area or move out of the Region. In either case, they will not move from one area in the Region to another area in the Region. Thus any effort to industrialize the Region must be local in nature, which means that separate development strategies must be designed for each of the local areas.

XVII.6 Summary

The manufacturing sector in Eastern Ontario is not a dominant force in its economic development.

Except the new modern high technology manufacturing industries such as transportation and communications equipment, and electronics, the largest manufacturing industries of the Region are slow-growth industries with an unfavourable industrial mix and low regional share.

There is no major, overall concentration of manufacturing industries in the Region. There is, however, some minor specialization of industries - Cornwall in chemicals and chemical products, Ottawa in printing and publishing, electronics and communications equipment, and Brockville in electrical products.

The manufacturing establishments in the Region lack spatial industrial linkages among themselves over space, and consequently, their spread and multiplier effects are not fully felt in the Region; they spill over to other parts of the country and World. This phenomenon provides a part of the explanation for a low impact of the manufacturing sector on the development of the Region. Also, the manufacturing sector in Eastern Ontario continues to lag behind its counterparts in other regions of Southern Ontario both in growth rates and in regional share.

CHAPTER XVIII

The Government Sector in the Twentieth Century

XVIII.1 Importance of the Government Sector in Eastern Ontario

The government sector is the largest source of employment in Eastern Ontario. In 1978, out of a total estimated number of 450,000 employees,¹ about 136,900 were employed by the government sector, i.e., 30.50 per cent (28.40 per cent of the total labour force), compared with 11.30 per cent of all employees (10.50 per cent of the total labour force) for the province of Ontario as a whole (Table 18.1). The manufacturing sector of the Region employs 14.52 per cent of all employees, compared with 22.67 per cent of all employees for Ontario, and 18.66 per cent of all employees for Canada.

Three quarters of government employment in Eastern Ontario is provided by the federal government, i.e., 102,000 jobs, out of the total of 136,900 (Table 18.2). About 85 per cent of federal employment in the Region is concentrated in the Ottawa area, excluding Hull (Table 18.3). Apart from the influence of the federal government in the Ottawa area, Eastern Ontario has Canadian forces bases at Petawawa, Barrifield and Trenton; a military college and a penitentiary at Kingston; the establishment of the Atomic Energy of Canada Ltd. at Chalk River; post-secondary academic institutions, notably Queen's University at Kingston, Carleton University, the University of Ottawa, and Algonquin College in Ottawa; and provincial government officials at major urban centres and local government personnel at county, municipal and rural district levels. Owing to this high concentration of government employment in the Region, four of its urban centres (Ottawa, Kingston, Pembroke and Trenton)

¹Total employment differs from total labour force in that it does not include that part of labour force which is looking for jobs.

TABLE 18.1

Estimate of Government Employees, Labour Force, Manufacturing Employees in Eastern Ontario, Ontario and Canada, 1978

	<u>Eastern Ontario</u>	<u>Ontario</u>	<u>Canada</u>
(1) Government Employees (Including Defence)	136,900	435,000	1,293,000
(2) Manufacturing Employees	64,200	872,400	1,861,000
(3) Total Labour Force	482,000	4,147,000	10,862,000
(4) Total Employment	450,000	3,847,000	9,972,000
(1) as % of (3)	28.4	10.5	11.88
(1) as % of (4)	30.50	11.30	12.97
(2) as % of (3)	13.50	21.02	17.10
(2) as % of (4)	14.52	22.67	18.66

* Includes Post-secondary Educational Institutions.

Sources: (1) Canada, Statistics Canada, Federal Government Employment September-December 1978 and Other Issues, Cat. No. 72-008, Quarterly (Ottawa: 1978, 1979)

(2) Local Government Employment, Various Issues, Cat. No. 72-009, Quarterly.

(3) Provincial Government-Employment, Various Issues, Cat. No. 72-007, Quarterly (Ottawa: 1978-1979).

(4) Labour Force, Annual Averages, 1975-1978, Cat. No. 71-529, Occasional, (Ottawa: 1979).

(5) Ontario, Ministry of Industry and Tourism, Industrial Survey, 1976, Annual.

(6) Ontario, Ministry of Colleges and Universities, Statistical Summary 1977-78 (Toronto: Statistical Section, No Date Indicated), pp. 32, 36-37.

TABLE 18.2

Government Employees, Eastern Ontario, 1978

	<u>Number</u>	<u>Wage Paid (\$million)</u>
Federal Employees	102,000	2,520.00
Provincial Government (including employees at higher education institutions or post-secondary educational institutions, approx 16,000) ²	19,900	348.28
Municipal Employees	15,000	178.35 ¹
Total	136,900	3,046.63

¹ Estimated by taking the average annual salary of an employee of the City of Ottawa and multiplying that by the estimated number of municipal employees in Eastern Ontario.

² Salaries of 16,000 employees (teaching and non-teaching) have been estimated on the basis of the average salary of an Ontario government employee. As this may constitute understatement of wages and salaries of these employees, because the teaching staff at the university level earns more than the average employee at the provincial governmental level, an adjustment was made by calculating the difference between the average salary of a university teaching member and the average salary of a provincial employee, and multiplying this difference by the number of university teaching staff and adding this sum to the total.

Sources: Same as in Table 18.1.

TABLE 18.3

Government Sector, Ottawa Area at December 1978

	No. of Employees	Wages Paid (\$000's)
(1) Federal Employment (departments and Crown corporations)	86,751	1,991,760
(2) Federal government enterprises (not included above)	4,000	91,838
(3) Local governments	7,052 ^a	118,312 ^a
(4) Provincial Government Employment	9,629	160,469
Total Ottawa Area	108,232	2,362,379

Estimated by assuming that the number of provincial employees in the Ottawa area is proportional to the population of the area. The use of "ratio" method may have resulted in overestimation of provincial employees in the Ottawa area in view of the concentration of Provincial Civil Service in Toronto.

Sources: (1) Canada, Statistics Canada, Market Research Book, Cat. No. 63-224 (Ottawa: April 1979), pp. 425-426.

(2) Local Government Employment, October-December 1978, Cat. No. 72-009, Quarterly (Ottawa: June 1979).

(3) Provincial Government Employment, October-December 1978, Cat. No. 72-007 (Ottawa: 1979).

TABLE 18.4

(Including Permanent and Temporary Employees)

Year	Employees at Departments, Headquarters (Ottawa)	Employees at Places Other Than Headquarters	Total
1920			47,133
1925	10,091	28,855	38,946
1930	11,290	32,885	44,175
1931	11,766	33,815	45,581
1932	11,818	32,199	44,017
1935	10,774	30,018	40,798
1939	11,848	34,258	46,109
1940	14,020	35,719	49,739
1941	19,593	47,333	66,926
1945	34,374	81,534	115,908
1950	29,771	97,425	127,196
1951	30,069	94,511	124,580
1965	50,273	160,104	211,077
1971			
1978	90,751	483,873 ²	574,624

¹Includes Bull

²Includes departments and Crown corporations and also members of armed forces, and also employees of departments with headquarters at Hull.

Sources: Canada, Dominion Bureau of Statistics, Civil Service of Canada, 1937, 1938, 1939, (Ottawa: Finance Statistics Branch, 1940), Table 1.

--, Canada Year Book, 1952, op. cit., p. 96.

--, Canada Year Book, 1967 (Ottawa: Queen's Printer, 1967), pp. 158-159.

Canada, Statistics Canada, Federal Government Employment, Cat. No. 72-004, Quarterly, Various Quarters for 1978 (Ottawa: 1978, 1979).

--, Federal Government Employment in Metropolitan Areas, Cat. No. 72-205, Annual (Ottawa: 1978)

may be called public administration centres where the government sector is dominant. In all, the government sector in the Region generates an annual income of about three billion dollars in the form of wages and salaries which constitutes about 45 to 50 per cent of the estimated gross domestic product of the Region.

XVIII.2 Growth of the Government Sector in Eastern Ontario

The government sector in the twentieth century expanded quite rapidly, especially during and after the first World War. During and after the first World War, the functions of the federal government expanded dramatically. The War brought into existence new departments to perform new services, e.g., veteran services for the settlement of soldiers. To finance these new services, additional taxes were required, and hence additional tax collectors and other officials. In January 1920, 47,133 persons were employed by the federal government. This level was not again reached until January 1940, when employees numbered 49,739¹ (including both part-time and full-time workers). About 28 per cent of them were located at departmental headquarters in Ottawa (Table 18.4).

After 1920, federal employment declined for a few years, but after 1925 it began to increase again. It continued to rise until 1932 when the depression became very severe and the government instituted a reduction of 10 per cent in the salaries and reduced the number of permanent civil servants.

The real surge of federal employment growth began in 1939 at the outset of World War II. Between 1939 and 1945, federal employment in Ottawa increased by 109 per cent. This was the second phase of the growth of federal employment, the first being during World War I. However, growth slowed down

¹Canada, Dominion Bureau of Statistics, Canada Year Book, 1951 (Ottawa: Queen's Printer, 1952), p. 95.

after the end of the Second World War until 1951 when it picked up again. Between 1938 and 1951, the index number of permanent and temporary civil servants stationed at departmental headquarters (i.e., in Ottawa) almost tripled.¹

Since 1951, barring short-run or seasonal fluctuations, government employment (at all levels of the government) has been growing. Between 1951 and 1971, federal employment almost doubled, while provincial employment has increased sixfold.² This increase has been due to the expansion in government functions because of the greater demand for public or semi-public goods (e.g., defence, health, education, social security), the demand for which can be satisfied more effectively collectively than individually. As a result, some departments such as Health and Welfare and the Unemployment Insurance Commission have expanded greatly.

With the rapid increase in federal employment, Eastern Ontario has experienced an increase in government employment, which has been important in the Ottawa area. Between 1951 and 1978, federal employment at Ottawa has increased threefold (Table 18.4). Comparable data are not available for earlier years.

The increase in government employment in the Region has also occurred due to expansion of municipal and provincial employment. Because data on provincial and municipal employment in the Region on a time series basis are unavailable, it is difficult to determine how much of the increase was due to

¹ Canada, Dominion of Statistics, Canada Year Book, op. cit., p. 97.

² J.E. Hodgetts, and O.P. Dwivedi, Provincial Governments as Employers: A Survey of Public Personnel Administration in Canada's Provinces (Montreal and London: McGill-Queen's University Press, 1974), pp. 10-11.

provincial employment and how much was due to local municipal employment.¹

The figures in Table 18.2 show that, currently, municipal employment accounts for only about 11 per cent of total government employment.

Other urban centres that contribute to government employment at all levels in the Region include² (with government employment shown in brackets): Kingston (8,217), Belleville (2,001), Chalk River (2,500-3,000), Trenton (909), Cornwall (880), Prescott (231), Brockville (90), Pembroke (258), Perth (199), Napanee (146), and Arnprior (102).

XVIII.3 The Government Sector and the Region's Growth

The government sector can be divided into two sub-categories: military and civilian. The treatment of government activities, measured by payroll and the level of employment, presents difficulties in any discussion of regional economic growth, as decisions as to where to locate governmental activities, especially the military activities, are generally based on non-economic factors such as strategic and climatic considerations.

Other characteristics of the government sector also make it different from other sectors of an economy. First, the activities of government contribute to local markets as opposed to export or non-local markets.³ Second, the

¹ Lack of this information does not pose any great problem for our analysis. In the case of municipal employment, it is generally accepted that it is a function of local population. Since Eastern Ontario does not enjoy population advantages over other regions, municipal employment is not relatively as of great importance as is federal employment. As regards provincial employment, it is well-known that the Central Region of Ontario (i.e., the Toronto area) has definite advantages over Eastern Ontario, since it is the Provincial Capital.

² See the profiles of urban centres in Appendix I for government employment in major urban centres in the Region. These figures should be interpreted cautiously as some of them do not include municipal employment.

³ Some government enterprises like Atomic Energy of Canada Ltd. may contribute to sales in foreign markets, e.g., the sale of Candu reactors.

government sector is relatively stable in terms of wages and employment, and in terms of expenditures incurred on the purchase of goods and services from the private sector, e.g., the purchase of machinery and equipment, furniture, stationery, building materials, office space and office cleaning. This feature of the government sector normally helps the regional economy to insulate itself from business cycles. But a sudden change in government policy, for example, a recent cut-back in hiring and a decentralization policy adopted by the federal government, or a cancellation of construction projects, can cause a problem of adjustment temporarily for a local economy.¹

There have not been many studies relating to the government sector and regional growth. Two such studies² in the U.S.A., one made in the 1960's and another in the 1970's, concern defence spending, and so may not apply to the situation in Eastern Ontario, where most government employment is civilian rather than military. However, the results may be worth noting as two of the urban centres (i.e., Trenton and Petawawa) of the Region are air force bases. These studies, especially the second, which analyzes the problem by using regression models, found that a weak relationship exists between personal income growth and military expenditures, and a significant negative relationship exists between military expenditures and income distribution, i.e.; a large proportion of military employees fall into lower income brackets.

¹ A recent report Economic Development Prospects in Ontario, by the federal Department of Regional Economic Expansion (DREE) notes that "the public sector's cutbacks in hiring, in addition to the federal government's decentralization policy, have created a significant no-growth in the local economy (of Ottawa)," p. 23.

² R. Bolton, Defense Purchases and Regional Growth (Washington, D.C.: The Brookings Institution, 1966), pp. 127-138; and P.M. Lankford, "Military Payroll and Regional Growth," Professional Geographer, Vol. XXVII, No. 2, (May, 1975), pp. 194-199.

In Eastern Ontario, this does not seem to be the case. Table 18.5 indicates that income distribution in Trenton approximates normal distribution because average income and median income of male employees are almost the same. However, average as well as median income in Trenton is lower than in most of the other centres of the Region especially in the centres where civilian employees of the government reside (Ottawa, Nepean, Gloucester or even Kingston) or, with the exception of Cornwall, in places where the manufacturing sector is quite important (Belleville, Brockville, Kingston) (Table 18.6).

The impact of government expenditures on Eastern Ontario can be estimated from the wages and salaries and their direct, indirect and induced income effects in the form of demand for office space, residential accommodation, retail expenditures, etc. These effects may vary according to the type of government expenditure and the region in which the expenditure is incurred, because of various leakages (taxes, imports, etc.).

A recent study¹ by Kubursi has determined the wage income effects and multipliers generated by various programs in the province of Ontario. Total incomes (including direct, indirect and induced effects) generated by wage incomes differ from program to program. Using the multiplier of 1.95 for "general government" given in Table 18.7, it is estimated that a total annual wage bill of about 3 billion dollars² incurred by the government sector in Eastern Ontario will generate total income effects of about 6 billion dollars.³

¹ A.A. Kubursi, "Differential Income and Employment Multipliers of Ontario Government Expenditures, in R.W. Boadway et al., edited by J. Bossons, Input-Output Analyses of Fiscal Policy in Ontario (Toronto: Ontario Economic Council, 1978), pp. 73-82.

² Estimated by adding the wages paid to government employees in the Ottawa area (Table 18.3) and the estimated wages paid to employees in other urban centres of Eastern Ontario.

³ This assumes that the effects of federal and provincial expenditures are similar.

Table 18.5

Employment Income, Trenton, 1970

	Number of Individuals	% Distribution of Individuals	Aggregate Employment Income of Individuals	% Distribution Aggregate Income
TOTAL	95	1.44	-	-
Zero Employment Inc. Reported				
Zero Employment Income Reported (Repeated)	100	1.51	-	-
Employment Income \$3000 and less (including loss)	2,020	30.56	2,492,190	7.30
Employment Income \$3000-5999	1,885	28.52	8,174,633	23.95
Employment Income \$6000-5999	2,060	31.17	15,565,100	45.58
Employment Income \$10000 and over	550	8.32	7,936,158	23.25
Positive or Negative Employment Income Reported	6,515	98.56	34,148,249	100.03
TOTAL	6,610	100.00	34,137,843	100.00

	Average Employment Income of Individuals	Aggregate Total Income of Individuals	Employment Income as % of Total Income
TOTAL	-	42,033	-
Zero Employment Income Reported			
Zero Employment Income Reported (Repeated)	-	44,245	-
Employment Income \$3000 and less (including loss)	1,234	3,088,535	80.69
Employment Income \$3000-5999	4,337	8,825,112	92.63
Employment Income \$6000-5999	7,556	16,756,152	92.89
Employment Income \$10000 and over	14,429	8,275,807	95.90
Positive or Negative Employment Income Reported	5,241	36,925,554	92.48
TOTAL	5,165	36,957,213	92.37

Source: Canada, Statistics Canada, Special Tabulation received from the Census Division, Employment Income Section.

TABLE 18.6

Average and Median Income for Working People
15 or Over, Eastern Ontario, By Incorporated
Cities, Towns or Townships with Population of
10,000 or over, 1971.

	<u>Average Income</u>	<u>Median Income</u>
<u>Belleville</u>		
Male	6,883	6,434
Female	2,896	2,435
<u>Brockville</u>		
Male	7,157	6,637
Female	3,210	2,551
<u>Cornwall</u>		
Male	6,130	5,760
Female	2,704	2,011
<u>Ottawa</u>		
Male	8,102	6,903
Female	3,723	3,021
<u>Pembroke</u>		
Male	5,967	5,423
Female	2,719	1,821
<u>Trenton</u>		
Male	6,661	6,541
Female	2,749	2,138
<u>Kingston</u>		
Male	7,061	6,419
Female	3,187	2,489
<u>Vanier</u>		
Male	6,241	6,140
Female	3,540	3,259
<u>Nepean</u>		
Male	10,141	9,860
Female	3,470	2,113
<u>Gloucester</u>		
Male	8,846	8,297
Female	3,140	2,272
<u>Kingston Township</u>		
Male	8,537	8,315
Female	2,975	2,164

Source: Canada, Statistics Canada, 1971 Census of Canada, Labour Force and Individual Income, Total Income for Urban Centres, Vol. III, Part I, Cat. No. 94-710, (Ottawa: Information Canada, 1974), pp. 33-1 to 33-10.

NOTE: Combined figures for male and female are not given by the publication listed above.

TABLE 18.7

Employment Income and Multiplier by Program
(per \$10,000 Expenditure)

Program	Direct and Indirect Employment & Income Effect	Direct, Indirect & Induced Employment Income Effect	Employment Income Multiplier (no Induced Effects)	Employment Income Multiplier (Induced Effects Included)	Initial Wages
Education	902	1207	1.12	1.17	7018
Transportation and Communication	2480	3153	1.94*	2.19*	2644
Health	1245	1591	1.20	1.25	6218
Social and Economic Welfare	899	1226	1.15	1.20	6145
Recreation and Culture	1724	2304	1.40	1.54	4265
Home and Community	1357	1831	1.23	1.31	5859
Industrial Development and Resources	1065	1388	1.17	1.22	6227
General Government	2613*	3288*	1.76	1.95	3444
Public Safety and Protection	624	807	1.08	1.10	7855*

*The largest value in each column.

NB: Employment income multipliers are calculated by adding direct and indirect income to initial wage income and then dividing the total of Summation by initial wage income.

Source: A.A. Kubursi, "Differential Income and Employment Multipliers of Ontario Government Expenditures," Op. cit., p. 81.

However, the above figure seems to be an upper limit as there are several programs that have a very low income multiplier.

The last two columns in Table 18.7 suggest that the larger the proportion of initial income that goes to wages and salaries, the lower the income multiplier.¹ In another study,² Kubursi showed that income effects of Ontario government expenditures do not stay in Eastern Ontario; rather they spill over to the "core region" of Central Ontario. This is because that most of the industrial purchases for the government programs come from the core region. This has an important implication for Eastern Ontario where a large proportion of personal income is derived from wages and salaries paid by the federal government.

Apart from being the largest employer, the federal government has also helped the Region by providing grants through the various programs administered by the Department of Regional and Economic Expansion (DREE). Two areas to benefit from these programs are Hawkesbury-Cornwall, and Pembroke-Renfrew.² Since 1971, the Hawkesbury-Cornwall area has received about \$20 million in the form of grants from DREE and the provincial government.³ These grants were aimed at stimulating the industrial growth and developing the tourist industry of the area. As a result, about 3,000 jobs were created directly and indirectly.

The Pembroke-Renfrew area received \$9.7 million (up to December 1978) in the form of grants under the Industrial Incentive Program;⁴ 1900 jobs were created as a result. In December 1977, the Region as a

¹This reasoning assumes that" (1) income derived from wages and salaries has more leakages than that derived from other sources;(2) income spent on wages and salaries involves less industrial purchases and hence more limited interindustry backward linkages.

²A.A. Kubursi, "Differential Sub-Regional Impact of Ontario Province Expenditure", in J. Bossons (editor), *op. cit.*, pp. 123-126. Important among them are: Industrial Incentives Program, Infra-structure Assistance, Development Opportunity Initiatives, and General Development Agreement.

³Compiled from Various Annual Reports of the Federal Department of Regional and Economic Expansion.

⁴Figures received from the Federal Department of Regional and Economic Expansion by telephone.

whole was promised another \$40 million over the next four years under the General Development Agreement (GDA) between Canada and Ontario.¹ Half of this amount was to go to agriculture and the remaining amount will be spent for the development of tourism and small businesses. It was hoped that this amount would generate an additional investment of \$500 million in the private sector.

XVIII.4 Summary

The government sector in Eastern Ontario has always been important since the settlement of United Empire Loyalists and since Ottawa became the Capital city in 1858. Its importance in the regional economy of Eastern Ontario has increased in the present century. In 1881,² the government sector employed only about 8 per cent of the Region's total employees, compared with the present figure of 31 per cent, an increase from 1,338 employees in 1881 to 139,000 in 1978. Today, the government sector dominates the economic activity of the Region but does not act as an engine of economic growth and does not transmit growth to other related sectors in such a way so as to make their growth self-sustainable. The growth of the government sector depends mainly on political decisions and is not, thus, reliable as a sustainer of economic growth. However, recently, research efforts, such as by the National Research Council of Canada and the Federal Department of Communications, have helped several high-technology firms in the Ottawa area to grow. Depending on the impact of these high-technology firms on the rest of the Region, the government sector in the future may become an engine of economic growth.

¹ Daily Commercial News (December 12, 1979).

² Census figures of government employment are not available on county basis after 1881.

CHAPTER XIX

Tourism and Recreation in the Twentieth CenturyXIX.1 Importance of Tourism

Tourism is vital to the economy of Eastern Ontario. About 8 per cent of the labour force of the Region is directly employed by the tourism/recreation sector. Approximately 17 per cent of the estimated gross income of the Region originates from tourism and recreation. In 1976, direct tourist expenditures in the Region totaled about \$613¹ million compared with \$4,314 million in the Province as a whole (Table 19.1). The figure reaches as high as \$987 million when direct, indirect and induced income effects are added. Thus, for every dollar of income derived from activities directly serving tourists, e.g., provision of accommodation, transportation, and food services, another 61 cents are generated in indirectly-related activities such as agriculture or real estate services (Table 19.2).

The importance of tourism and recreation can also be gauged from its contribution to regional taxes and the interregional distribution of income. A recent study by the Ministry of Tourism found that employment and income effects of tourism tend to be sectorally and regionally differential. The less-developed regions tend to benefit from the income and employment generated by tourist expenditures more than in proportion to the size of population.² This occurs for two reasons. First, tourism and recreational activities are relatively labour-intensive and require mostly unskilled labour which is locally

¹This figure and others used in this Chapter are underestimates for the Eastern Ontario Planning Region as they relate to the economic region of Eastern Ontario. See above Chapter I.

²Ontario, Ministry of Industry and Tourism, The Economic Impact of Tourism in Ontario and Regions, 1966 (Toronto: Tourism Policy and Research Section, 1978), p. 37.

Table 19.1
Direct Income, Total Income, and Income Multipliers* Generated By Tourism
in Ontario By Region and Sector, 1976
 (\$ millions)

	Sector						
	Public Transportation	Accommodation	Food and Beverage	Amusement & Recreation	Retail Sales	Service Station	Total
Eastern Ontario	93.1 (1.37)	92.3 (1.16)	159.2 (1.26)	41.9 (2.24)	114.9 (2.09)	111.4 (1.95)	612.8 (1.61)
Lake Ontario	20.1 (1.11)	40.8 (1.15)	71.6 (1.23)	19.2 (2.15)	33.1 (2.76)	55.1 (1.76)	239.9 (1.71)
Central Ontario	327.6 (1.11)	131.5 (2.10)	341.2 (1.67)	81.8 (3.11)	197.5 (2.53)	164.0 (3.66)	1243.6 (2.06)
Niagara	64.2 (1.11)	73.3 (2.10)	148.4 (1.67)	72.2 (3.11)	90.2 (2.53)	60.5 (3.66)	308.8 (2.06)
Lake Erie	138.0 (2.15)	109.7 (1.50)	219.8 (1.48)	122.9 (1.70)	257.9 (2.86)	209.3 (3.46)	1057.6 (3.42)
Lake St. Clair	23.9 (2.78)	12.1 (3.50)	39.6 (2.35)	8.6 (5.00)	31.7 (3.85)	26.0 (4.16)	141.9 (3.35)
Midwestern Ontario	66.4 (2.34)	42.3 (3.50)	93.2 (2.35)	43.0 (5.00)	122.2 (3.85)	108.2 (4.16)	475.3 (3.35)
Georgian Bay	36.1 (2.34)	45.6 (1.50)	96.3 (1.45)	43.2 (1.78)	68.7 (2.40)	47.6 (2.81)	337.5 (1.98)
Northeastern Ontario	29.2 (2.40)	11.0 (3.92)	47.6 (2.11)	8.6 (4.97)	25.2 (4.60)	32.9 (3.42)	154.5 (3.14)
Northern Ontario	70.0 (2.40)	43.1 (3.92)	100.6 (2.11)	42.7 (4.97)	115.8 (4.60)	112.5 (3.42)	484.7 (3.14)
Northwestern Ontario	26.1 (1.71)	77.3 (0.86)	116.1 (0.95)	44.8 (1.38)	78.1 (1.50)	104.7 (1.19)	447.1 (1.17)
Total (Ontario)	1037.8 (1.56)	872.3 (1.47)	1708.0 (1.45)	832.8 (2.23)	1836.4 (2.43)	1617.5 (2.47)	8104.8 (1.88)

Source: Ontario Ministry of Industry and Tourism, The Economic Impact of Tourism in Ontario and Regions (Toronto: Tourism Policy and Research Section, 1978), p. 26.

Notes: (1) Figures in first and second rows against each region refer respectively to direct and total incomes generated by tourist expenditures and those in parenthesis denote income multiplier.
 (2) Income Multiplier = $\frac{\text{Total income}}{\text{direct (original) tourism expenditure}}$

available. Second, owing to the local availability of labour and other facilities such as food and accommodation, leakages of income from tourism and recreation will be small, compared with manufacturing activities which require some materials and capital equipment that may not be supplied locally. Thus, the development of tourism and recreation has great potential for the development of Eastern Ontario and the reduction of income disparities in the light of its relatively high unemployment rate, low level of manufacturing activity, and considerable leakages of income effects (spillovers) into the central core regions of Ontario.

XIX.2 Bases of Tourist and Recreational Facilities in Eastern Ontario

Tourist and recreational facilities in a region depend primarily on its natural features. Physiography, water resources, wild life, climate, environment for outdoor recreation, the natural resource base, and historic, cultural and man-made points of interest are among the important features that determine the base for tourist and recreational facilities.

Physiography

Among the three physiographic regions in Eastern Ontario, the Shield area covers about two-thirds of the Region and is characterized by hilly topography, crystalline bedrock, thin soil, forests, abundant lakes, and fast-flowing rivers. These features provide attractions for outdoor recreational activities such as camping and cottaging. The physiographic regions of the Ottawa Valley and the St. Lawrence Lowlands have a wide variety of topography ranging from fertile land and low elevation to a shallow to deep soil mantle.

Water Resources

Eastern Ontario contains two natural waterways (the Ottawa and the St. Lawrence) and the Canal system joining the Rideau Waterway as well as a part of the Trent-Severn Waterway, and the many inland lakes and streams. These lakes and streams support a variety of recreational activities including swimming, boating, cottaging, fishing and sight-seeing. For example, in 1969, there were 113 commercial cottage establishments, 135 hotels and motels, and 27 camp grounds along the Rideau waterway between Ottawa and Kingston. Also the number of seasonal hydro contracts (presumably for cottages) increased from 800 in 1951 to 4,456 in 1969 along the Rideau waterway. Many cottages are now used as bases for winter activities such as skiing. The cottagers in the Rideau area tend to shop in such communities as Westport, Perth, Smiths Falls, Kemptville and Portland, thus providing a stimulus to the local economies.² A large number of vessels (about 7,600 in 1969), such as large pleasure cruisers, outboards, house boats and canoes use the Rideau Waterway.

Wildlife

Wildlife is very important to tourism. It affords excellent sight-seeing, nature observation and photography and hunting opportunities. There are several hunting areas along the Rideau Waterway.

Climate

Weather influences almost every outdoor recreational/tourist activity and the extent of the participant's satisfaction. Summers in Eastern Ontario

¹ Sometimes the Rideau Waterway and the Trenton-Severn Waterway are termed the Rideau-Trent-Severn Waterway. Canada-Ontario Rideau-Trent-Severn Study Committee, The Rideau-Trent-Severn, Canada's Unique 425-mile Waterway Corridor (Toronto: Queen's Printer, 1971), p. 25.

² Ibid., p. 25.

are relatively shorter than winters. The winter tends to be colder in the Region than in Central and Western Ontario. However, snow in winter provides a good basis for skiing and ice for skating.

Capability for Outdoor Recreational Use

The term "capability for outdoor recreational use" of the natural features of an area has been devised by the Ontario Ministry of Natural Resources. The Ministry has evaluated the landscape of Ontario according to its natural features and has developed a two-fold classification of land use for recreation through the Canada Land Inventory: intensive and extensive recreation capability. Intensive recreation capability involves a permanent impact on the landscape and includes beach activities such as swimming, boating, concentrated cottaging, camping, lodging, fishing (year round), downhill skiing and viewing. Extensive recreation capability includes activities such as hiking, automobile driving, hunting, and cross-country skiing.

Areas that have a high capability for recreational use include Lower Allumette and Lake Coulonge (swimming, camping and cottaging), the Rideau Lakes (swimming, camping, cottaging, boating, angling), the Thousand Islands (swimming, camping, cottaging, boating, enjoyment of scenic beauty, visiting historic sites), Lac Des Chats, Lac Deschênes (swimming, camping, cottaging), the Prince Edward County Complex (parks, beaches, historic sites, boating, etc.), and Petawawa River (swimming, camping and cottaging). Areas of extensive recreational capability in Eastern Ontario include the County of Renfrew, the Rideau Lakes area and a part of the Pre-Cambrian Shield. Extensive recreational activities such as hunting serve a tourism function, attracting people to the Region from other parts of the country and the U.S.A.

Public parks, operated by the federal and provincial governments, represent another attraction for recreation. In 1975, about 11.23 million people visited provincial parks in Ontario, of whom about 1.12 million visited provincial parks in Eastern Ontario.¹

XIX.3 Tourist Areas

Three tourist zones can be identified in Eastern Ontario, i.e., Trenton-Cornwall, Renfrew-Kingston, and Ottawa. The following classification has been used to describe the existing tourist/recreation attractions and events: (i) cultural, (ii) historical, (iii) agricultural, (iv) recreational (wildlife, sight-seeing), and (vi) business. These attractions and events are of regional, provincial, or national importance.²

(a) Trenton-Cornwall

The attractiveness of this zone, which extends from Trenton to Cornwall along the St. Lawrence Lowlands, lies in natural shoreline features and numerous historical, cultural and educational attractions and events that are situated close to the area's urban centres. Old Fort Henry (built in 1812 for defense fortifications and now a museum of British and Canadian military history) at Kingston and Upper Canada Village (a showpiece of Canadiana of the 1800 era) near Morrisburg are two major historical attractions of the zone, which have provincial as well as national importance. Other attractions of this area are the Eastern Island Tours at Brockville, the Thousand Islands boat trips at Gananoque, the Bellevue historic site (home of Sir John A. Macdonald, Canada's first Prime Minister), the Royal Military College and Queen's University at Kingston.

¹ Balmer, Crapo & Associates, Inc., Tourism Development in Ontario: A Framework for Opportunity, Appendices, Prepared for Ministry of Industry and Tourism, Province of Ontario (Toronto: No date for publication), p. 60.

² Ibid., pp. 213-217.

The zone is highly accessible to visitors. Total tourist and recreational expenditures for this zone amounted to \$118,000,000 in 1973, of which 38 per cent came from visitors from other provinces in Canada, 32 per cent from Americans, and 30 per cent from Ontario residents.¹ The major reasons for visits to the zone relate to cottaging (32 per cent in the case of Ontario visitors, and 10.3 per cent in the case of U.S. visitors) and visits to friends and relatives (30 per cent in the case of Ontario residents, and 23.7 per cent in the case of U.S. visitors).² Accommodation used by the visitors includes their own cottages (37 per cent in the case of Ontario residents, 23.3 per cent in the case of U.S. residents), rented cabins/cottages (23.3 per cent in the case of U.S. residents), trailers and campsites (18.4 per cent in the case of U.S. visitors and 25 per cent in the case of Ontario residents) and others (hotels, motels, home of friends, etc.).

(b) Renfrew-Kingston

This zone stretches along the Rideau Canal and Lakes in the South and East and the Mississippi River and Lake and the Ottawa River in the Northwest of Eastern Ontario. It is mainly rural and thus depends on the natural environments for resort attractions. Visitor participation in this zone is predominantly outdoor recreation oriented (cottaging, fishing, boating, swimming). The majority of these recreational facilities are concentrated around Kingston, Perth and Smiths Falls. With the exception of the Rideau Canal and historical buildings in Kingston, few other historical, cultural, or man-made attractions exist in the zone.

¹ Balmer, Crapo & Associates, op. cit., p. 203.

² Ibid., p. 206.

It is estimated that in 1977 the zone received 1.26 million visitors, over half of them were Ontario residents (52 per cent), primarily from Eastern and Central Ontario.¹ Approximately 35 per cent of them were from other provinces and the remaining 13 per cent from the U.S.A. A large proportion of Ontario visitors (48 per cent)² stayed in cottages and hobby farms, whereas 16.2 per cent of American visitors used their own cottages for accommodation.

The total tourist/recreational expenditure in this zone amounted to \$23.6 million of which 46 per cent came from Ontario residents, 22 per cent from Americans and 32 per cent from other Canadians.

Proposed Timber Town in the Renfrew Area

In 1977, the government of Ontario proposed the establishment of a "timber town" near Arnprior in Renfrew County to capture the spirit of the Ottawa Valley during the great square-timber era.³ It was to include a logging camp, several rides, theatres, a steam boat and craft and display areas. It was expected that it would attract 500,000 to 600,000 visitors during the first year. The attendance is expected to grow to approximately 730,000 visitors in the tenth year of the operation.⁴ It was also expected that the timber town project would cost about \$12.3 million (in 1978 dollars) and create 38 direct full-time jobs and 289 part time jobs, resulting in a direct payroll of \$1.2 million (1978 dollars) in wages and salaries.⁵ Based on the assumption of an

¹De Leuw Cather (Canada) Ltd., Tourism in Development Opportunities in Trenton-Cornwall Zone and Renfrew-Kingston Zone, 1977.

²It is not clear whether all of the cottage accommodation was owned by Ontario visitors.

³The construction of this project began in May 1982.

⁴Development Planning Associates Ltd., Peter Crane Associates, Kilborn Limited, Timber Town, Proposed Development Plan, Prepared for the Ontario Ministry of Industry and Tourism and the County of Renfrew, October 1978, p. 2.

⁵Does not include employment and payroll provided by hotels/motels.

expenditure level of \$11.41 per day per visitor, it was anticipated that net operating expenditures would be \$4.6 million in 1982 and \$6.4 million by 1991 (in 1978 dollars).¹

Ottawa Zone

The Ottawa zone is mostly urban. It is different from other zones because of its connection with the French culture and its being the site of the capital of the country. Its attractions are mostly historical, cultural, educational, agricultural and recreational. Historically, its main attractions are: Parliament Buildings, Royal Canadian Mint, Canadian War Museum, Canadian Aeronautical Collection, Laurier House, National Archives, and Museum of Canadian Scouting. Cultural attractions of the Ottawa zone include: National Arts Centre, National Gallery of Canada, National Museum of Man and National Museum of Natural Sciences. The Canadian Tulip Festival, Changing of the Guard, Central Canada Exhibition (also an agricultural attraction), Rideau Canal Cruises, and Rideau Canal Skating are among the recreational attractions in the Ottawa zone. Ottawa has some educational attractions too, viz., the National Library of Canada, University of Ottawa, Carleton University, Algonquin College, and the National Museums of Man, and Science and Technology.

In 1972, about 2.1 million tourists visited the Ottawa zone, of whom 1.03 million were sight-seeing in the Region between July 1st and Labour day.² Visitors from Ontario accounted for 54 per cent of the total, while those from other provinces in Canada and from the U.S.A. constituted respectively 40 and 6 per cent of the total.³ Among Ontario visitors, 49 per cent came from Central

¹ Development Planning Associates Ltd., et al., op. cit., p. 14.

² Ibid., p. 12.

³ Balmer, Crapo & Associates, Inc., op. cit., p. 216.

Ontario for weekends and 25 per cent for vacations; 22 per cent came from Eastern Ontario for weekends; and 23 per cent came from the Niagara region for vacations.

A large proportion of visitors from all parts of Canada visit Ottawa for a short trip of less than one week and about 72 per cent of U.S. visitors stay in Ottawa only for two nights or less. This means that visitors to this zone come for its scenic beauties and historical and cultural attractions, and do not stay long, implying low spread effects of tourist activities in this zone. However, it may be noted that Ottawa, being one of the major educational, historical and cultural centres of Canada, attracts visitors all the year round.¹

Total expenditures on tourism and recreation in the zone approximated \$180 million in 1973-74, of which 47.25 per cent came from visitors from other provinces in Canada, 42.23 per cent from visitors from Ontario, and the remaining 10.52 per cent from the U.S.A.² However, this does not take into account expenditures incurred by tourists on the Quebec side of the Ottawa-Hull area.

XIX.4 Economic Impact of Tourism

The use of tourist and recreational facilities involves several activities which are directly or indirectly related to them. Therefore, income and employment effects of tourism and recreation can be determined by estimating their impact both on directly related activities (e.g., accommodation, food and beverage, amusement and recreation, public transportation, service stations, retail sales, and miscellaneous) and indirectly related activities (e.g., agriculture, real estate, manufacturing industries; etc.). To these

¹Balmer, Crapo & Associates Inc., op. cit., p. 213.

²Ibid., p. 216.

direct and indirect effects may be added induced effects (i.e., consumption and investment effects induced by the income of households and businesses which derive income from tourist services) to determine the total income and employment effects of tourism and recreation. The extent of total income and employment effects depends on various "leakages" (e.g., imports, spillovers to other regions, and taxes) and the rate of utilization of the existing capacity of firms that cater to tourism and recreation. Finally, the effects of tourism and recreation depend on the type of activity. For instance, sight-seeing does not create as great an effect as other types of vacation activity of tourism because scenic activity does not often involve renting accommodation for more than a few days.

Income Effects¹

In 1976, direct tourist expenditures in the Region stood at \$612.8 million, about 26 per cent of which was spent in the food and beverage sector, 18.6 per cent on retail sales, 18.5 per cent on service stations, 15 per cent on each of accommodation and public transport, and 7.9 per cent on amusement and recreation (Table 19.1). Total income generated by tourist expenditures (including direct, indirect and induced income effects) amounted to \$986.7 million, 24.4 per cent of which was accounted for by the retail sector, 22 per cent by service stations, 20.3 per cent by the food and beverages sector, 13 per cent by public transport, and 9.5 per cent by amusement and recreation (calculated from Table 19.1). Income multipliers generated by original tourist and recreational expenditures (calculated by dividing total income by

¹The analysis of income and employment effects of tourist expenditure, in Eastern Ontario is based on an old classification by "economic region" (see above). Since the geographic area of the Economic Region is smaller than the area of the planning region of Eastern Ontario, the total income and employment effect figures for the latter would be larger than those given here.

TABLE 19.2

Comparison of Tourism and Industrial Multipliers
in Ontario

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<u>Industry</u>	<u>Income Multipliers</u>	<u>Employment Multipliers</u>
1 Agriculture, Forestry and Fishing	1.65	2.46
2 Mining	.36	.62
3 Meat and Poultry	3.52	5.60
4 Dairy Products	4.33	5.64
5 Grain Mills	2.35	4.22
6 Biscuits and Bakeries	1.88	2.69
7 Sugar and Confectioneries	1.07	1.74
8 Other Food Industries	1.65	2.82
9 Soft Drinks	1.04	1.53
10 Distilleries, Breweries and Wineries	1.18	2.43
11 Tobacco and Tobacco Products	3.19	7.50
12 Rubber Products	1.49	2.26
13 Leather and Leather Products	1.28	1.80
14 Cotton Yarn and Cloth	.76	1.12
15 Synthetic Textiles	1.04	1.67
16 Knitting Mills	1.91	2.75
17 Clothing Industries	.25	.39
18 Other Textile Mills	1.14	1.67
19 Sawmills	.78	1.20
20 Furniture and Fixtures	1.89	2.71
21 Other Wood Industries	1.45	2.03
22 Pulp and Paper Mills	.74	1.19
23 Paper Products	1.97	2.82
24 Printing and Publishing	1.81	2.61
25 Iron and Steel Mills	.84	1.40
26 Other Primary Metals	.76	1.08
27 Fabricated and Structural Metals	1.33	2.08
28 Metal Stamping, Pressing & Coating	1.95	2.90
29 Other Metal Fabricating Industries	1.42	2.04
30 Miscellaneous Machinery	.84	1.35
31 Motor Vehicles and Aircraft	1.20	1.78
32 Other Transportation Equipment	1.20	1.78
33 Electrical Appliances	1.93	2.77
34 Electrical Industrial Equipment	1.77	2.62
35 Communication Equipment	1.42	2.08
36 Other Electrical Products	1.22	1.77
37 Clay, Lime and Cement	1.64	2.56
38 Other Non-metallic Mineral Products	1.24	1.78
39 Petroleum Refineries and Coal Products	2.14	4.75
40 Plastics and Synthetic Resins	4.27	6.20
41 Paint and Varnish		
42 Pharmaceuticals and Medicines	1.57	2.31
43 Other Chemical Industries	1.04	1.52
44 Miscellaneous Manufacturing Industries	1.50	2.44
45 Construction, Maintenance and Repair	1.16	1.65
	2.07	2.94
46 Transportation, Storage and Trade		
47 Utilities	1.13	1.69
48 Communications and Other Services	1.23	2.11
49 Tourism	1.52	2.65
	1.88	1.56

Source: Calculation from Ontario Input/Output Table, derived by
A.A. Kubursi, Econometric Research Ltd., Burlington, Ontario, 1978.

original income). The income multiplier for tourist expenditure in Eastern Ontario (1.61), though smaller than its counterpart in five out of eight economic regions of Ontario, is still larger than several industrial multipliers (Table 19.2). The relative low income multiplier of tourist expenditure in Eastern Ontario is perhaps the result of high "leakages" in income generation effects. As most of the manufactured goods and machinery and equipment are manufactured in regions other than Eastern Ontario, it is likely that the indirect effects of tourist expenditures may be leaking away from the Region. These leakages appear to be lower than those in the manufacturing sector. Despite these possible leakages, the total tourist expenditures generated in Eastern Ontario constitute about 17 per cent of the estimated gross income (\$6 billion in 1976) of the Region.¹

Employment Effects

The original tourist and recreational expenditure of \$612.8 million in the Region generated about 37,000 man-years of direct employment (8.6 per cent of the labour force of the Region) in activities directly serving tourism and, a further 16,300 man-years in indirectly related activities, for a total employment of about 53,000 man-years (Table 19.3). The employment multiplier generated by direct (original) tourism/recreation employment is 1.43, i.e., for every direct man-year of employment generated in all tourism sectors combined, a further 0.43 of a man-year was supported in industries indirectly related to tourism. This multiplier figure is lower than those for Lake Ontario, Central Ontario, Niagara, Lake Erie, Lake St. Clair, and Midwestern regions but higher than those for Georgian Bay, Northeastern and Northwestern regions of Ontario.

¹ Estimated by the author.

TABLE 19.3
Total Labour Force, Employment and the Employment Multipliers
Generated by Tourism, by Region

Region	Employment Labour Force (1975) (1)	Direct (2)	Per Cent (2) (1) x 100	Direct, Indirect and Induced (3)	Per Cent (3) (1) x 100	Employment Multiplier (3) (2)
Eastern Ontario	429.1	36.9	8.6	52.9	12.3	1.43
Lake Ontario	114.0	14.7	12.9	21.2	18.6	1.44
Central Ontario	1,359.0	72.4	5.3	123.4	9.1	1.70
Niagara	531.0	31.4	5.9	51.6	9.7	1.64
Lake Erie	225.1	8.5	3.8	18.7	8.3	2.19
Lake St. Clair	238.0	20.9	8.8	32.2	13.5	1.54
Midwestern Ontario	206.0	9.2	4.5	19.4	9.4	2.11
Georgian Bay	154.4	27.9	18.1	33.5	21.7	1.20
Northeastern Ontario	257.7	25.3	9.8	34.6	13.4	1.37
Northwestern Ontario	98.2	13.5	13.8	17.9	18.2	1.33
Total	3,612.5	260.7	7.2	405.4	11.2	1.56

Source: Same as in Table 19.1

Table 19.4
Wage and Salary Income* Generated by Tourist Expenditure,
By Region, and Sector, 1976
(\$ Millions)

Region	Public Transportation	Accommodation	Food and Beverage	Amusement & Recreation	Retail Sales	Service Stations	Total
Eastern Ontario	72.2	72.1	128.6	53.8	132.6	123.5	582.8
Lake Ontario	20.3	31.5	56.7	24.0	44.4	57.0	233.9
Central Ontario	227.5	146.0	330.2	124.6	257.9	274.6	1,360.8
Niagara	65.7	65.1	131.1	82.0	127.4	97.3	568.6
Lake Erie	27.7	17.2	43.8	17.2	53.5	46.3	205.7
Lake St. Clair	36.8	39.0	81.1	49.4	84.6	64.7	355.6
Midwestern Ontario	30.6	17.0	49.6	17.1	48.3	51.1	213.7
Georgian Bay	22.0	53.5	83.0	47.0	74.5	89.9	369.9
Northeastern Ontario	30.8	52.3	80.5	41.4	85.3	91.4	381.7
Northwestern Ontario	17.0	27.9	44.4	20.8	44.4	42.6	197.1
Total	550.6	521.6	1,029.0	477.3	952.9	938.4	4,469.8

*Pertains to direct, indirect and induced employment income.

Labour Income

The size of a payroll is another measure of the impact of tourism. In 1976, out of \$613 million directly generated by tourist expenditures, about \$583 million were distributed in the form of wages and salaries. The striking observation concerning the regional payrolls generated by tourism (Tables 19.4 and 19.1) is that their size and value are not in exact correspondence with the total income generated by tourist expenditures. For instance, as shown in Table 19.4, Eastern Ontario derived the second largest payroll from tourism, although it derived the third largest total income from tourism (Table 19.1).

XIX.5 Implications of the Income and Employment Effects of Tourism

The policy implications of the income and employment effects of tourism and recreation are clear. Tables 19.1 to 19.4 indicate that tourism has differential income and employment effects sectorally as well as regionally. Objectives of income and employment generation can be maximized by emphasizing those subsectors where the impact of tourist expenditures is the greatest and where the multiplier effects are the highest. The lack of correspondence in the ranking of various regions between total tourist income and tourist payrolls shows that tourist expenditure favours distribution of income among the working class. Further, the fact that the richest region (Central Ontario) derives from tourist expenditures less income in proportion to its population size also carries income distribution connotations.¹

¹ For example, Central Ontario in 1976 received \$2,562 million as total income from tourism while its share on the basis of its population should have been \$2,918 million. On the other hand, a poor region like Northwestern Ontario would have received \$259.4 million on the basis of population, compared to the actual figure of \$314 million. Ontario Ministry of Industry and Tourism, The Economic Impact of Tourism in Ontario and Regions, op. cit., p. 37.

These observations suggest that tourist expenditures, with their non-neutral expansionary effects on income, employment, and distribution of income, might be used as an instrument of policy to reduce inter-regional income and employment disparities.

CHAPTER XX

Population Changes and Urban Development
in the Twentieth CenturyXX.1 Population Trends

The population of Eastern Ontario as a percentage of the total population of Ontario continued to decline even in the twentieth century. Table 20.1 indicates that Eastern Ontario's share of Ontario's population declined from 23.2 per cent in 1901 to 13.9 per cent in 1971, while that of Central Ontario increased from 43.7 per cent in 1901 to 60.3 per cent in 1971. The percentage share of Western Ontario has also been declining since 1901.

In spite of the declining share of population in Eastern and Western Ontario, both regions exhibited an increase in population in absolute as well as percentage terms until 1961 (Tables 20.1 and 20.2).¹ The percentage population increase in Eastern and Western Ontario regions was small in the beginning of the century but it gathered momentum immediately after the Second World War and reached its peak between 1951 and 1961. During the 1901 to 1971 period, the population of Eastern Ontario increased by 111 per cent, while that of Central Ontario increased by about 387 per cent and that of Western Ontario rose by 98 per cent (Table 20.2). Thus, the population growth in Eastern Ontario between 1901-1971 was much lower than the population growth in Central Ontario, but marginally higher than that in Western Ontario.

Intraregional distribution of population and its growth rates are presented in Tables 20.3 and 20.4, respectively. Table 20.3 shows the population

¹Population growth rate in Western Ontario in 1931-1941, however, recorded a slowdown to be followed by a higher growth rate in the succeeding decades, till 1961.

TABLE 20.1

COMPARISON OF EASTERN ONTARIO'S SHARE OF
ONTARIO'S POPULATION, 1901 TO 1971
(Population rounded to Nearest Hundred)

YEAR	EASTERN ONTARIO		CENTRAL ONTARIO		WESTERN ONTARIO	
	NUMBER	SHARE %	NUMBER	SHARE %	NUMBER	SHARE %
1901	507,100	23.2	953,400	43.7	597,600	27.4
1911	508,700	20.1	1,192,000	47.2	581,700	23.0
1921	533,100	18.2	1,493,500	50.9	613,300	20.9
1931	557,200	16.2	1,805,100	52.6	683,400	19.9
1941	613,200	16.2	1,974,300	52.1	714,100	18.9
1951	704,200	15.3	2,479,800	53.9	849,800	18.5
1961	922,700	14.8	3,542,700	56.8	1,020,900	16.4
1971	1,071,100	13.9	4,644,900	60.3	1,180,500	15.3

SOURCE: Calculated from Canada, Statistics Canada, 1971, Census of Canada, Population, 1961-1971, Census Subdivisions (Historical), Cat. No. 92-702, Vol. 1, Part I (Ottawa: Information Canada, 1973), Table 2, pp. 2-58 to 2-79.

TABLE 20.2

COMPARISON OF NET POPULATION CHANGE AND GROWTH RATES
IN EASTERN, WESTERN, AND CENTRAL
ONTARIO, 1901 TO 1971

YEAR	EASTERN ONTARIO		WESTERN ONTARIO		CENTRAL ONTARIO	
	Number	Growth %	Number	Growth %	Number	Growth %
1901 - 1911	1,500	0.3	-15,900	-1.26	238,600	25.2
1911 - 1921	24,500	4.8	31,600	5.43	301,500	25.29
1921 - 1931	24,000	4.5	70,100	11.42	311,600	20.96
1931 - 1941	56,100	10.6	30,700	4.49	169,200	9.37
1941 - 1951	90,900	14.82	135,800	19.01	505,500	25.60
1951 - 1961	216,600	30.75	171,000	20.12	1,062,900	42.86
1961 - 1971	149,900	16.28	159,700	15.64	1,102,200	31.11
1901 - 1971	563,500	111.1	583,000	97.7	3,691,500	387.19

SOURCE: Calculated from Table 20.1.

TABLE 20.3

POPULATION: EASTERN ONTARIO PLANNING REGION, BY COUNTIES

1901 - 1971

	1901	1911	1921	1931	1941	1951	1961	1971
Carleton	96,904	119,384	148,705	170,040	206,367	246,298	358,410	471,931
Dundas	19,757	18,165	17,309	16,098	16,210	15,818	17,162	17,457
Frontenac	44,534	42,604	44,494	45,756	53,717	66,099	87,534	101,692
Glengarry	22,131	21,259	20,518	18,666	18,732	17,702	19,217	18,480
Grenville	21,021	17,545	16,644	16,327	15,989	17,045	22,864	24,316
Hastings	59,291	55,803	57,523	58,846	63,322	74,298	93,377	99,393
Lennox and Addington	37,232	34,375	32,993	32,856	33,143	35,601	40,313	42,259
Leeds	37,975	36,753	34,909	35,157	36,042	38,831	46,889	50,093
Prescott	23,282	20,386	18,994	18,883	18,469	19,544	23,717	28,359
Prince Edward	27,035	26,968	26,478	24,596	25,261	25,576	27,226	27,832
Renfrew	17,864	17,150	16,806	16,693	16,750	18,559	23,108	20,640
Russell	52,715	51,856	51,505	52,227	54,720	66,716	89,635	90,875
Stormont	20,282	21,649	21,121	18,487	13,601	13,615	15,414	16,287
	27,042	24,775	25,134	32,524	40,905	48,458	57,867	61,302
Total Eastern Ontario	507,065	508,672	533,123	557,166	613,228	704,160	922,733	1,070,916

SOURCE: Same as in Table 20.1

TABLE 20.4

PERCENTAGE POPULATION GROWTH RATES IN EASTERN ONTARIO

1901 - 1971

Counties of Eastern Ontario	1901- 1911	1911- 1921	1921- 1931	1931- 1941	1941- 1951	1951- 1961	1961- 1971	1901- 1971
Carleton	23.20	24.56	14.34	21.30	19.00	47.50	31.63	387.00
Dundas	-8.05	-4.71	-6.99	0.60	-2.41	13.52	1.69	-11.60
Frontenac	-4.53	4.43	2.83	17.39	23.05	32.42	16.17	128.34
Glengarry	-3.94	-3.48	-9.02	0.35	-5.79	8.55	-3.82	-16.49
Grenville	-16.53	-5.13	-1.92	-2.11	6.60	33.78	6.35	15.67
Hastings	-5.88	3.08	2.29	7.60	17.33	25.67*	0.01*	67.00
Lanark	-7.67	-4.02	-0.41	0.88	7.41	13.23*	4.82	13.50
Leeds	-3.28	-5.01	0.71	2.51	7.73	20.75*	6.83	31.95
Lennox and Addington	-12.68	-6.83	-0.58	2.24	5.82	21.47	19.57	21.80
Prescott	-0.24	-1.81	-7.10	2.70	1.24	6.45	2.22	2.90
Prince Edward	-3.99	-2.00	-0.67	0.34	10.80	24.51	11.95	15.53
Renfrew	-1.62	-0.66	1.40	4.77	21.92	34.35	1.38	72.38
Russell	6.73	-2.48	-12.47	-35.92	0.06	13.21*	5.66	-24.52
Stormont	-8.38	1.45	29.40	25.76	18.46	19.41	5.93	126.69
Eastern Ontario	.32	4.80	8.20	.71	14.83	31.04	16.05	111.23

SOURCE: Same as in Table 20.1

*Boundary Changes

of the Region by counties for the period 1901-1971. During this period, the County of Carleton (now Regional Municipality of Ottawa-Carleton) dominated the Region and it increased its share of the Region's population from 19.11 per cent in 1901 to 44.05 per cent in 1971.¹ The County also recorded the highest growth rate (i.e., 387 per cent). The other counties that witnessed growth rates of more than 50 per cent during the same period were: Frontenac (128 per cent), Stormont (126 per cent), Renfrew (72.38 per cent) and Hastings (67.0 per cent). Among the counties that experienced negative growth rates were: Dundas (-11.60 per cent), Glengarry (-16.49 per cent) and Russell (-24.52 per cent) (Table 20.4).

XX.2 Patterns of Population Change 1901 to 1971

The foregoing percentage growth-rates analysis of population changes explains population changes in the Region as a whole but does not explain how the addition to the Region's population was distributed within the Region. It also does not explain the contribution of population growth of a particular geographic area to regional growth. The analysis of "shift"² has been used to assess the contribution of an area's growth to the Region's overall growth, and also to compare the performance of these geographic areas (counties) with that of the Region or Province.

¹According to the preliminary counts of Census of Population, 1976, the population of the Ottawa-Carleton Region was 501,729, which is about 46 per cent of the total population of the Region, viz., 1,120,420. The present Regional Municipality of Ottawa-Carleton (created in 1968) comprises the area of old County of Carleton and Cumberland Township (previously in the County of Russell). The township had only 1.9 per cent of the total population of the Regional Municipality.

²The theoretical basis of shift/share techniques were discussed in Chapter XVII.

The first step in these calculations is to compute the population change which would have occurred in each county if it had grown at the same rate as the Region. The upward or downward shift of a given county (the difference between its actual increase in population and the expected increase based on the average growth rate for the region) is expressed as a percentage of the total upward or downward shift of a region. The result provides a quantitative measure of a county's performance relative to that of the other counties, based on a region as a norm.

To determine the pattern of population growth of Eastern Ontario, shift analysis has been carried out for the decades 1941 to 1951, 1951 to 1961, and 1961 to 1971 (See Table 20.5). The results indicate that:

- (1) Population growth among Eastern Ontario counties during the past 30 years was unevenly distributed. Of the 14 counties, only two showed a consistent upward shift (i.e., grew more rapidly than the Region as a whole), while the remaining counties showed a downward shift. Carleton and Frontenac counties together accounted for 98.54 per cent of the total upward shift in 1961-1971.
- (2) The counties with an upward shift were those possessing at least one of the largest urban centres. For example, Carleton County contains the Ottawa metropolitan (Ontario part) area and Frontenac County contains Kingston, the second largest urban centre in the Region.
- (3) The difference in the growth pattern of counties is becoming more extreme. Between 1941 and 1971, the number of counties with an upward shift decreased from five to two, while the number with a downward shift increased from nine to eleven. The contribution of Carleton to the regional population shift increased from 44.92 per cent in 1941-1951 to 98.39 per cent in 1961-1971.

XX.3 Sources of Population Growth 1901 to 1971

There have been two sources of population growth: (1) natural increase, and (2) net migration. The first is defined as the excess of the number of births over deaths in the population. The latter is the difference between the number of in-migrants and the number of out-migrants. Of the two sources,

TABLE 20.5
Population Shift in Eastern Ontario, 1941-1971

	1941-1951					1951-61					1961-1971				
	Actual		Expected		County's Shift as Percent of Region's	Actual		Expected		County's Shift as Percent of Region's	Actual		Expected		County's Shift as Percent of Region's
	(A)	(E)	(A)	(E)		(A)	(E)	(A)	(E)		(A)	(E)	(A)	(E)	
	Shift	Region	Shift	Region		Shift	Region	Shift	Region		Shift	Region	Shift	Region	
Carleton	37931	30500	9331		14.92	112112	76392	35760		31.64	113521	57532	55889		33.39
Frontenac	-338	2403	-2501		-13.48	1347	-4745	-3398		-5.70	295	2797	-2464		-4.37
King	12382	7955	-4417		-11.26	21435	19300	1605		4.11	4158	1405	63		15.17
Lennox & Addington	-1030	2777	-1807		-18.33	1515	5311	-3736		-9.22	737	3072	-2333		-4.17
Northumberland	-1055	2371	-1312		-6.33	5819	5113	706		1.80	3378	3072	-306		-3.82
Ontario	10967	9332	1635		7.98	13079	22289	-9210		-8.22	6016	15013	-8997		-3.94
Quebec	245	-434	-2556		-11.62	4712	10481	-5769		-15.30	1945	4482	-4536		-3.04
Simcoe	2789	5344	-2555		-12.30	8048	11849	-3801		-9.23	3204	2540	-836		-7.69
Wellington	1075	2733	-1658		-8.01	4173	5853	-1680		-4.33	4842	1374	3500		1.56
York	315	3745	-3530		-16.51	1650	7672	-6022		-15.43	506	379	-3772		-10.97
Prince Edward	1809	2484	-675		-3.25	4589	5568	-1019		-2.61	3715	3715	-1373		-11.95
Simcoe	11326	8114	3212		18.70	22113	20015	-2098		-7.44	1242	1242	-13173		-23.25
Wellington	14	2017	-2003		-9.64	1739	425	-2256		-5.36	573	2478	-1905		-2.84
Simcoe	7553	6052	1491		7.18	2409	14537	-12100		-13.14	3335	3335	-5370		-10.41

Source: Calculations by the Author from Various Decennial Censuses.

net migration is more volatile and plays an important role in regional development.

A recent study¹ by the Ministry of Treasury, Economics and Intergovernmental Affairs has analyzed the sources of population growth in all the five planning regions of Ontario for the period 1941-1971. The study found that net migration played an insignificant role in the population growth of Eastern Ontario between 1941 and 1951. Natural increase accounted for 96 per cent of the total population change, whereas net migration constituted only 4 per cent of the total population change.² During the same time, in Central Ontario net migration accounted for 56 per cent of the population change (Table 20.6).

Between 1951 and 1961, Eastern Ontario attracted quite a significant number of migrants. Consequently, the contribution of net migration jumped to 35 per cent as compared with only 4 per cent between 1941 and 1951. However, from 1961 to 1971, the pace of net migration into the Region slowed down. Net migration accounted for 23 per cent of the population change; the remaining 77 per cent of the population change was due to natural growth. Thus, there has been no persistent net migration flow to Eastern Ontario. Over the whole period 1941 to 1971, net migration accounted for 25 per cent of the population change. The remaining population change was due to natural increase. The inter-regional comparison of sources of population change gives an interesting result. Population change in Central Ontario was mainly the result of in-migration. From 1941 to 1971, 53 per cent of the population change

¹Ontario, Ministry of Treasury, Economics and Intergovernmental Affairs, Ontario's Changing Population, Vol. I: Patterns of and Factors of Change 1941-1971 (Toronto: Regional Planning Branch, 1976), p. 52.

²Ibid., p. 52.

TABLE 20.6

PROPORTION OF POPULATION CHANGE DUE TO NATURAL INCREASE AND NET MIGRATION

1941 - 1951, 1951 - 1961, 1961 - 1971 AND 1941 - 1971

Region	1941 - 1951			1951 - 1961			1961 - 1971			1941 - 1971		
	NO.	% OF TOTAL CHANGE	NO.	% OF TOTAL CHANGE	NO.	% OF TOTAL CHANGE	NO.	% OF TOTAL CHANGE	NO.	% OF TOTAL CHANGE	NO.	% OF TOTAL CHANGE
	NATURAL INCREASE	NET MIGRATION	NATURAL INCREASE	NET MIGRATION	NATURAL INCREASE	NET MIGRATION	NATURAL INCREASE	NET MIGRATION	NATURAL INCREASE	NET MIGRATION	NATURAL INCREASE	NET MIGRATION
Eastern	37,700	3,200	95	4	141,200	75,400	65	35	115,300	34,800	77	23
Central	234,100	271,400	45	54	503,300	554,600	48	52	511,600	590,600	47	54
Western	87,300	148,500	64	36	22,400	22,400	87	13	114,600	45,000	72	28
Northeastern	73,000	-21,400	150	-50	112,000	23,300	83	17	86,700	-41,600	188	-88
Northwestern	23,400	5,700	80	20	40,500	5,300	81	19	30,700	-22,900	393	-293
Ontario	505,500	304,400	62	28	953,600	835,000	58	42	860,900	605,900	59	41
											2,350,000	1,595,300
											59	41

SOURCE: Source: Ontario, Ministry of Treasury and Intergovernmental Affairs, Ontario's Changing Population Patterns..., op.cit., p.52.

in Central Ontario occurred through net migration, while in Eastern and Western regions, the contribution of net migration was only 25 per cent. In the Northeastern and Northwestern regions, the contribution of net migration was even negative.

Fluctuations in migration in Eastern Ontario are dominated by fluctuations in migration in the Ottawa/Carleton area, which is a major area of attraction for migrants. The attraction of this area is owing not to an industrial base but rather to a government base. Expansion of the Federal Public Service has attracted a large number of civil servants from all over the country. During the decade 1961-1971, the Ottawa-Carleton area witnessed an increase of 32 per cent in its population, of which 53 per cent was due to net migration. Kingston is another centre with positive net migration. In comparison with Toronto, however, these two areas are still weak centres of attraction. Moreover, the net migration to the Ottawa-Carleton area from the rest of Eastern Ontario has been very insignificant. For example, between 1966 and 1971, only one per cent of net migrants from the Eastern Ontario Region (excluding the Ottawa-Carleton area) chose Ottawa-Carleton as their final destination, while 47 per cent went to Alberta and British Columbia, five per cent to London, 12 per cent to Waterloo and the remaining 33 per cent to the rest of Ontario.¹ With regard to intra-regional movements of people, the study found that the County of Frontenac and the Regional Municipality of Ottawa/Carleton had net migration gains during all three decades, viz., 1941 to 1951, 1951 to 1961, and 1961 to 1971.

¹ Ontario, Ministry of Treasury, Economics and Intergovernmental Affairs, Ontario Changing Population, op. cit., Table 20, p. 65.

All the remaining counties had negative net migration (See Tables 20.7 and 20.8) at least in one period or another. The counties of Russell, Glengarry, Prescott and Dundas are chronic cases of negative net migration.

With the exception of Ottawa, intra-provincial movements of the people are the major source of migration. Between 1966 and 1971, more than 50 per cent of the migrants were from within the Province. The proportion of migrants from outside the Province and outside the country to various urban centres was small (Table 20.9), and the Region as a whole is not considered "attractive" by potential immigrants.

XX.4 Urban Growth 1901 to 1971

As noted earlier, 62 per cent of the total population of the Region inhabited rural areas by the end of 1901. Some of the counties (viz., Lennox and Addington, Dundas, Prince Edward, Russell, Stormont) were mostly rural where more than 75 per cent of the population lived in the rural areas.¹

¹ Figures on rural and urban population before 1951 are based on population living in incorporated cities and towns irrespective of the size of the population. They do not adequately reflect the stage of urbanization, since the population surrounding the big centres may not be incorporated. For the 1951 Census, urban population was defined as all people living in cities, towns, villages of 1000 and over, whether incorporated or not, plus those living in urban fringes of census Metropolitan areas. The census definition of urban population was changed in 1961, 1966 and 1971. However, the urban population for 1961 and 1966 was later calculated using the 1971 Census definition, which defines urban population as people living in incorporated cities, towns and villages with a population of 1000 and over, plus people living in unincorporated places of 1000 and over but having a population density of at least 1000 per square mile, and people living in the built-up fringes of incorporated and unincorporated cities, towns and villages having a minimum population of 1000 and a density of at least 1000 per square mile. See Canada, Statistics Canada 1971 Census of Canada, Profile Studies, Catalogue No. 99-702, Vol. 5 (Part I) Bulletin 5.1-2 (Ottawa: Information Canada, 1976), p. 5.

TABLE 20.7

COUNTIES WITH NET OUT-MIGRATION,
ONTARIO 1941-1971

COUNTIES	TOTAL NET MIGRATIONS 1941-1971	% OF TOTAL
EASTERN ONTARIO		
Dundas	-4,100	2.6
Glengarry	-6,900	4.5
Hastings	-800	0.5
Lanark	-500	0.3
Prescott	-10,400	6.6
Prince Edward	-2,600	1.7
Renfrew	-1,800	1.2
Russell	-5,000	3.2
Stormont	-4,800	3.1
CENTRAL ONTARIO		
Halliburton	-300	0.2
WESTERN ONTARIO		
Bruce	-5,600	3.6
Drey	-5,500	3.6
Huron	-5,400	3.5
Kent	-900	0.6
Perth	-2,500	1.6
NORTHERN ONTARIO		
Cochrane	-40,000	25.8
Hantoulin	-4,600	3.0
Parry Sound	-11,300	7.3
Timiskaming	-29,300	19.0
Kenora	-6,400	4.1
Rainy River	-6,200	4.0
TOTAL	-154,600	100.0

All other Counties have net migration gains
(i.e. positive sign)
SOURCE: Ontario, Ministry of Treasury, Economics and Intergovernmental
Affairs ... GP. CLE., p. 50.

TABLE 20.8

SUMMARY OF NET MIGRATION GAIN/LOSS BY GROUPS OF COUNTIES,
1941-1951, 1951-1961, and 1961-1971

Counties With Net Migration Gains In All Three Time Periods	Counties With Net Migration Losses In All Three Time Periods	Counties Which Fluctuate In Migration Gains/Losses During The Three Time Periods
<u>SOUTHWESTERN ONTARIO REGION</u>		
Middlesex Oxford	Russell Glengarry Prescott Dundas	Essex London Elgin Perth
<u>CENTRAL ONTARIO REGION</u>		
Niagara Wentworth Waterloo RM Wellington Halton Peel York RM + Metro Simcoe Ontario Durham Northumberland Peterborough	Cochrane Timiskaming Manitoulin Parry Sound	Brace Huron Grey Bruce
<u>NORTHEASTERN ONTARIO REGION</u>		
Rainy River		
<u>NORTHWESTERN ONTARIO REGION</u>		
<u>EASTERN ONTARIO REGION</u>		
Frontenac Ottawa/Carleton		Prince Edward Hastings Lennox/Addington Renfrew Leeds Lanark Grenville Stormont
<u>SOUTHWESTERN ONTARIO REGION</u>		
Hippisling Sudbury Algoma		
<u>NORTHWESTERN ONTARIO REGION</u>		
Thunder Bay Kenora/Patricia		

TABLE 20.9
Population of Five Years and Over, and Migration, Urban Centres,*
Eastern Ontario

Municipality	Population 1971	Migration 1966-71	Migration from Ontario	Migration from Different Province	Migration from Out- side Canada	Residence not stated in 1966	Migration Ratio (Migration 1966-71 Population 1971)
Ottawa	280070	70975	23580	25370	17085	4940	.25
Kingston	54490	14335	7285	2205	3675	1170	.26
Belleville	32515	8945	6030	1285	930	700	.27
Cornwall	43785	6810	4015	1785	595	415	.15
Brockville	18195	4150	2790	595	455	510	.22
*Pembroke	15325	3395	2140	735	285	225	.22
Trenton	13205	4615	2140	1310	850	315	.34
Arnprior	5580	1315	735	380	130	70	.23
Smith Falls	9060	1690	1255	170	140	125	.18
Perth	5350	1110	935	90	65	20	.20
Carleton Place	4600	1255	935	170	90	60	.27
Prescott	4785	1035	765	150	80	40	.22
Renfrew	8795	2180	1455	290	300	135	.25
Hawkesbury	8590	1365	635	520	105	105	.16

*Data on Municipal Basis

Source: Special Tape (No. EOF 1B2DEMCOL, RAKHRA), Received from Statistics Canada.

The beginning of the present century witnessed an increasing rate of urbanization in terms of the proportion of population living in urban areas. In 1901, only 39 per cent of the Region's population lived in urban areas; but by the end of 1971 the percentage had risen to 73 (Table 20.10).

The rates of rural-urban shift $\Delta(U/P)$ peaked during 1931-1941 (See Table 20.11). The growth rate of the urban population was smaller in the first quarter of the present century than in the nineteenth century. However, the situation was reversed after the 1930's. The urban growth rate rose as high as 41.62 per cent between 1951 and 1961. This rapid urban growth was due largely to immigration to major urban centres of the Region, especially to Ottawa. Marginal rates of urbanization $\frac{\Delta U}{U} / \frac{\Delta P}{P}$, though greater than one throughout the twentieth century, has been on the decline since 1901, except between 1961-1971 when it increased marginally. This means that urbanization growth rates exceeded the population growth rates.

Growth of Urban Centres

The Region possesses only one urban centre with a population of more than 100,000 (i.e., Ottawa). The population of the Ontario side of the Metropolitan area of Ottawa, according to the Census of 1971, was 502,526 (Table 20.2). It experienced the highest rate of population growth between 1951 and 1961 (See Table 20.13). The next largest and the fastest growing urban centre during the period 1901-1971 was Kingston. Cornwall, the third largest city in the Region, also experienced population growth but its growth was not consistent over the period. According to the Census of 1976, Cornwall lost 1,625 people as compared with its population in 1971. The growth rates of the

TABLE 20.10

PERCENTAGE DISTRIBUTION OF RURAL-URBAN POPULATION BY COUNTIES

EASTERN ONTARIO PLANNING REGION 1901 to 1971

County or Census Division	1901	1911	1921	1931	1941	1951*	1961*	1971*
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Carleton	33	67	24	76	24	76	21	79
Dundas	75	25	75	25	74	26	73	27
Frontenac	55	45	51	49	46	44	43	57
Glengarry	85	15	83	17	82	18	82	18
Grenville	66	34	65	35	65	35	61	39
Hastings	64	36	63	37	55	45	53	47
Lanark	63	37	51	49	47	53	44	56
Leeds	63	37	59	41	56	44	57	43
Lennox & Addington	82	18	82	18	80	20	77	23
Prescott	74	26	73	27	69	31	69	31
Prince Edward	75	25	71	29	72	28	69	31
Renfrew	72	28	69	39	63	37	59	41
Russell	86	14	80	20	79	21	83	17
Stormont	75	25	71	29	69	31	65	35
Eastern Ontario	62	38	56	44	51	49	48	52
Ontario	57	43	47	53	42	58	40	60

Source: Calculated from Table 20.10. Various Population Censuses.

*Slight changes in the definitions of urban areas. For changes in rural/urban definition in various censuses, see Statistics Canada, 1971 Census of Canada, Profile Studies, The Urban and Rural Composition of the Canada's Population, Cat. No. 99-72 (Ottawa: Information Canada, 1976), p. 5.

TABLE 20.11
Various Measures of Urbanization
Eastern Ontario Planning Region, 1901-1971

Measure of Urbanization	1901-1911	1911-1921	1921-1931	1931-1941	1941-1951	1951-1961	1961-1971
$\Delta(U/p) \times 100$	6	5	3	7	6	5	5
$(\frac{\Delta U}{U}) \times 100$	13.03	16.56	12.02	23.92	23.84	41.62	23.48
$(\frac{\Delta U/U}{\Delta P/P}) \times 100$	41.96	3.44	2.67	2.37	1.61	1.34	1.46

Source: Same as in Table 20.10.

TABLE 20.12

Population in Major Urban Centres
of Eastern, Central and Western Planning Regions

	1901	1911	1921	1931	1941	1951	1961	1971	1976
Eastern Ontario									
Ottawa C.	59928	87062*	107843	126872	154951	202045*	268202	302341	291088
Ottawa CMA	-	-	-	-	-	227056	344214	453280	502526
Kingston C.	17961	18874	21753	23839	30126	33459	53526	59047	59804
Kingston CMA	-	-	-	-	-	47560	72992	85877	93895
Cornwall C.	6704	6598	7419	11126	14117	16899+	43639+	47116	45491
Trenton C.	-	-	-	-	-	26222	28650	34702	37029
Belleville C.	9117	9876	12206	13790	15710	19519	30655+	35128	37029
Brockville	8940	9374	10043	9736	11342	12301	17444+	19726	19566
Pembroke C.	5156	5626	7875	9368	11159	12704	16791+	16544	14722
Trenton	4217	3988	5502	6276	6323	10085	13118+	14509+	15211
Hawkesbury	4150	4400	5544	5177	6263	7194	9661	9276+	9647
Salath Falls	5155	6370	6790	7108	7159	8441	9603	9585	9149
Renfrew	3153	3846	4906	5296	5511	7360	8435	9193+	8530
Central Ontario & Western Ontario									
Toronto C.	-	-	-	-	-	-	1919531	2648043	-
Toronto CMA	-	-	-	-	-	1210440	401404	498523	-
Hamilton CMA	-	-	-	-	-	280293	401404	498523	-
London CMA	-	-	-	-	-	128977	226669	286011	-
St. Catharines CMA	-	-	-	-	-	-	257196	303429	-
Brantford City	-	-	-	-	-	-	-	-	-
Windsor City	-	-	-	-	-	-	-	-	-

Blank entries indicate that municipalities were not defined at that date and no data was available.

*Indicates boundary changes.

Sources: Census of Canada, various years.

TABLE 20.13

Percentage/Population Growth of the Major Urban Centres of Eastern Ontario
Planning Region by Each Decennial Period From 1901 to 1971

	1901-11	1911-21	1921-31	1931-41	1941-51	1951-61	1961-71	1971-76
Ottawa C.	45.27*	21.85	17.64	22.13	30.39*	32.74	12.72	-3.66
Ottawa CMA	-	-	-	-	-	51.19	31.68	10.86
Kingston C.	5.08	15.25	7.75	28.52	11.04	59.97*	40.31	1.23
Kingston CMA	-	-	-	-	-	53.43*	17.65	9.33
Cornwall C.	-1.58	12.43	49.96	26.88	19.70	158.23*	7.99	-3.56
Trenton	-5.74	47.99	6.33	32.61	21.17	30.07*	11.21	4.26
Trenton CMA	-	-	-	-	-	-	9.26	11.79
Belleville C.	8.32	23.59	12.97	13.92	24.24	57.05*	14.61	-1.22
Brockville	4.85	7.13	-7.50	16.49	8.45	41.81*	13.08	-0.97
Pembroke C.	9.11	39.97	18.95	19.11	13.84	32.17*	-1.28	-12.36
Hawkesbury	6.2	25.76	-6.62	20.98	14.86	20.39	7.10*	3.83
Salath	23.61	6.60	4.68	0.70	17.30	13.76	-0.18	-4.76
Renfrew	21.97	27.56	7.95	4.05	33.56	21.40	2.66*	-7.00

Sources: Table 20.13

*Indicates slight boundary changes.

**This rapid growth reflects a major boundary change in 1961 when the population of Cornwall rose to 46,639 from 18,158 in 1956.

urban centres of the Region show that the fastest growing centres are the largest centres. With the exception of Trenton and Hawkesbury, all the smaller centres experienced a slowdown or negative population growth rates, especially after 1971.

XX.5 The Urban System by Size - Distribution

In any planning or economic region, urban centres tend to behave in differing degrees as an integrated system. The degree of this integration, the form in which it is expressed and the way it has changed over time provide an insight into the nature of urban growth and its regularities. Patterns of urban hierarchy determine the fashion of transmission of growth from one urban centre to another. One way of examining regularities in the distribution of urban growth is the rank-size rule of city-size distributions.

City-Size Distributions: Theoretical Basis

In the literature, two types of bases for urban regularities have been used, viz., the central place formulations of Christaller¹ and Lüscher² and the rank-size of Zipf.³ These formulations are well documented and hence need not detain us here for long. Christaller and Lüscher hypothesized a hierarchical structure of urban places and Zipf postulated a continuum of city sizes. Although seemingly contradictory,⁴ the two theories have been reconciled by

¹W. Christaller, Central Places in Southern Germany (New Jersey: Eaglewood Cliffs, 1966), translated by C. Baskin from Die Zentralen Orte in Süddeutschland (Jena: Gustav Fischer, 1944).

²A. Lüscher, The Economics of Location, Second Revised Edition (New Haven: Yale University Press, 1954).

³G.K. Zipf, Human Behaviour and the Principle of Least Effort (Cambridge: Addison Wesley Press, 1949).

⁴See Brian T. Robson, Urban Growth: An Approach (London: Methuen and Co. Ltd., 1973) for an excellent discussion on various types of size distribution, and for reconciliation among them.

Professor Berry, who points out that they are not actually in conflict, but rather are concerned with different sub-systems.¹ We will examine briefly whether there are central place and rank-size distribution regularities in Eastern Ontario.

XX 5.1 Central Place Hierarchy

When we speak of a "hierarchy" of cities in Eastern Ontario, we are not suggesting that these cities or centres are closely interconnected in terms of sales of goods and services, movements of capital, spread of technology or even migration. Most of the centres in the Region have closer economic ties with cities outside the Region than they do with each other. The results of the questionnaire, given in Chapter XVII, clearly indicate that economic relations of the centres in the Region are closer with the centres in the "rest of Canada" and "the rest of the World" than with other centres in Eastern Ontario. The "economic space" in which most of these centres are located is very wide indeed, and in some cases worldwide.

The ties that seem to exist among the cities of Eastern Ontario are of the following types:

- (1) Some centres serve as dormitories for others. This relationship is apparent in the case of Almonte, Arnprior, and Carleton Place with respect to Ottawa; but there is also commuting in both directions between Belleville and Trenton, and between Brockville and Prescott. As time goes by and roads are improved, other cities of the Region are likely to become dormitories for Ottawa to a greater or lesser extent, viz., Smiths Falls, Perth, Kemptville, etc.
- (2) Some centres serve as shopping centres for particular goods and services for the smaller towns and the countryside of the Region. This is true of Ottawa, Kingston, Belleville and Cornwall. The goods and services provided by such cities are largely those which are not available in the smaller centres, but not so "rare" that they would be found only in Toronto or Montreal.

¹B.J.L. Berry, "Cities as Systems within Systems of Cities," in J. Friedman and W. Alonso, eds., Regional Development and Planning (Cambridge, Mass.: MIT Press, 1964), p. 132.

- (3) There is a flow of population in both directions between Ottawa and Perth, and Ottawa and Smiths Falls for recreation facilities. People go to Perth or Smiths Falls for boating, fishing, etc. and come from these centres to Ottawa for more urban kinds of recreation.
- (4) Sophisticated services to small centres are provided mainly by Ottawa and to some degree by Kingston. Banking services are provided in most of the small centres themselves. Centres near Ottawa look to it for consulting services, and computer facilities, while those around Kingston and Belleville depend upon Toronto for these services. The results of the questionnaire show that about 50 per cent of the firms in Eastern Ontario depend on Ottawa for sophisticated shopping and 25 per cent for insurance and computing services.

XX.5.2 Rank-Size Rule and Size Distribution

Research relating to an urban-size hierarchy is faced with the following three questions:

- (1) Is the hierarchy different from what might be expected?
- (2) Is the size of any particular city within the hierarchy more or less what might be expected?
- (3) How much does the hierarchy differ from that of other areas or regions?

Answers to these questions presuppose some kind of standard with which the hierarchy might be compared. One type of standard that is widely used is the "rank-size rule", commonly associated with the name of George K. Zipf. Enunciated in the simplest form, the rank-size rule states that for a group of cities or centres in a country or region, the population of any individual city or centre bears a direct relationship to its rank by size and to the population of the largest city. If, for example, the cities are ranked from the largest to the smallest, the second city will have a population one-half of the largest, the third will have a population one-third of the largest and so on. The relationship could be expressed by the following equation:

$$P_r = \frac{P_1}{r^q}$$

where P_1 is the population of the largest or first ranking city or centre,

P_r is the population of the city or centre of rank r ,

r is the rank of the city in descending order of size, and

q is an empirically derived parameter. Its value would be one under perfect rank-size rule distribution.

Transforming the above relationship into linear form, one obtains:

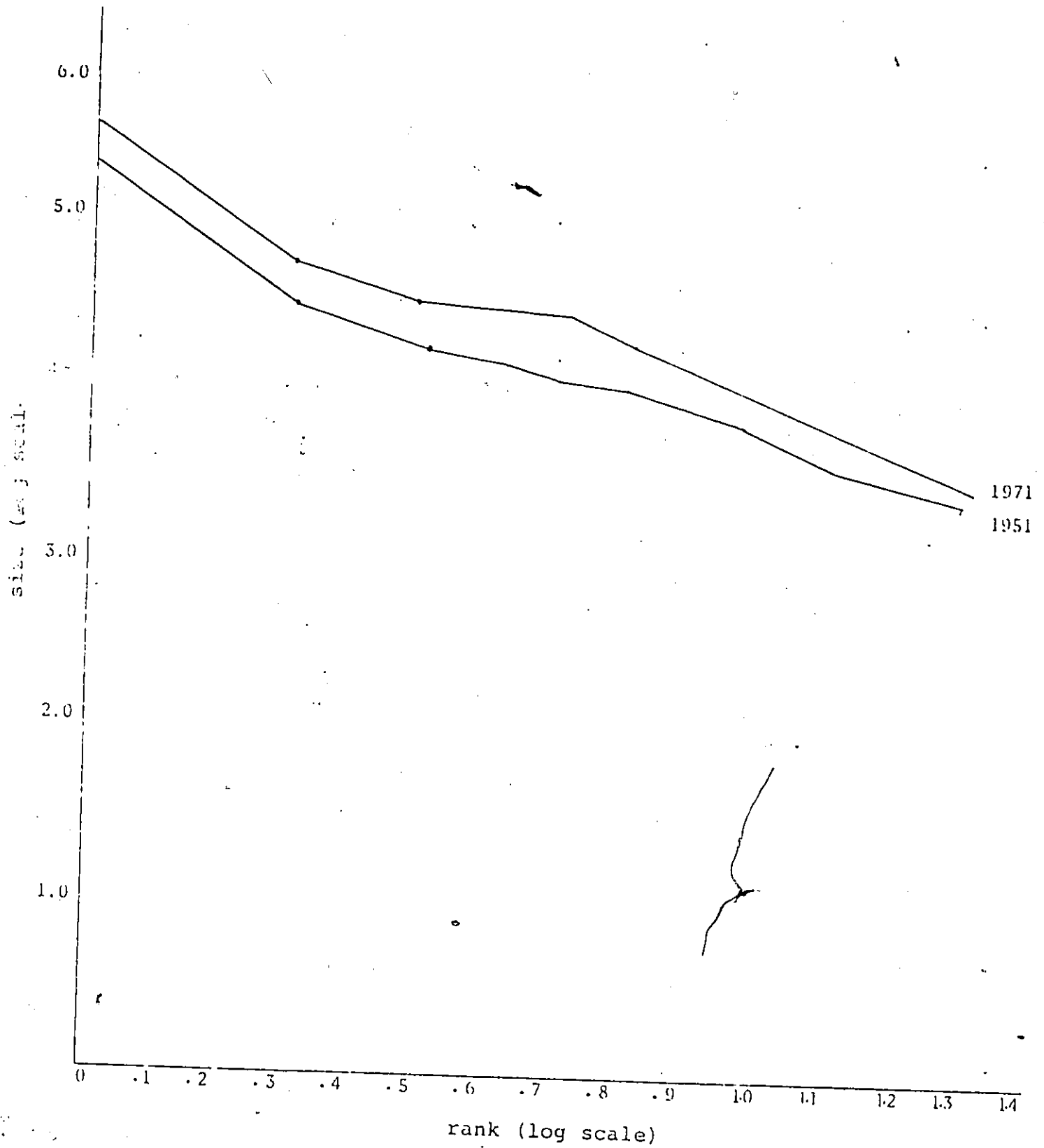
$$\log P_r = \log P_1 - \log r$$

There are a number of ways of expressing the rank-size relationship and, deviations from it. One way is to plot rank against size on double logarithmic paper. This relationship will give us a straight line with a slope of $-q$.

This slope coefficient expresses the degree of concentration or dispersion of population within the urban system. In the case of Eastern Ontario the rank-size rule has been plotted for two years, 1951 and 1971. It has been found that the Region's urban hierarchy does not conform to the rank-size rule as Kingston the second largest centre in the Region, is only about 20 per cent of the size of Ottawa - the largest urban centre. Most of the centres fall between the population range of 8,000 to 20,000. Thus, there is a concentration of centres at the lower end of size distribution (Graph 4.1).

Regression Results: This rank-size rule was also tested by regression analysis. The purpose of the analysis was to study changes in the urban structure of the Region through changes over time in the rank-size distribution. Twenty-one urban centres in Eastern Ontario were used as a cross-sectional series for the years 1951, 1956, 1961 and 1977. Since 1951, the ranking of the Region's system of cities has shown a remarkable distributional stability in size. The relationship hypothesized by Zipf explains more than 95 per cent of the variable (as expressed by the coefficient of determination R^2) for all

Urban Hierarchy and Rank-Size Rule: Eastern Ontario



the years, with the exception of 1951 (Table 20.14), but it must be noted carefully that a considerable degree of the fit between theoretical and actual values is inevitable owing to the ranking procedure.¹ Since 1951, the trend has been towards conformity to the rank-size rule (reflected in increasing R^2). Furthermore, the increase in the intercept and the slope indicates that the urban system of Eastern Ontario has changed since 1951, although at a very slow rate.

XX.6 Urban Growth and Regional Development

In contrast to the demographic concept of urbanization treated here, the process of urbanization is sometimes viewed as a structural change affecting the activities and the growth of an entire region. It is generally believed that increasing urbanization is accompanied by a rapid process of industrialization concentrated in metropolitan areas. According to the theory of concentration growth, the increasing concentration of industries in urban metropolitan areas will raise the level of income and employment of the hinterland. However, as knowledge of interactions between urban growth and regional development accumulates, it is becoming clear that urban centres as true growth-inducing centres do not exist everywhere. Historically, most of

¹J.B. Davies, "Behaviour of the Ontario-Quebec Urban System by Size Distribution", in L.S. Bourne, et al., Urban System Development in Central Canada: Selected Papers (Toronto: The University of Toronto Press, 1972), p.38.

TABLE 20.14

Rank Size Rule
 Regression Equations Results, 1951-1971
 Eastern Ontario Region Urban Centres

Year	Log P_1	q	R^2
1951	5.30	-1.08	.89
1956	5.34	-1.16	.95
1961	5.42	-1.27	.98
1966	5.46	-1.30	.98
1971	5.46	-1.31	.99

Log P_1 is logarithm (base 10) of population of the largest city of Eastern Ontario (Ottawa)

q is slope coefficient

R^2 is coefficient of determination

the cities have grown as central places, i.e., they have grown because of the growth of the surrounding region, where the majority of the people were engaged in primary activities, viz., farming, fishing and processing industries.

Two studies in the U.S.A. have shown that the expansion of the growth of the American cities such as New York and Boston in the nineteenth century was essentially a commercial-servicing growth caused by continental trade.¹ Using regression analysis, the authors of the study have found that the hinterland variable is significantly related to Northeastern city growth, where rapid expansion of the hinterland has stimulated favourably located urban economies. Thus, it was the region which was propulsive, the cities being "growth centres" in the sense of reactors to growth generated in the hinterland. From these historical developments, it can be suggested that in the early stages of economic development when the majority of the people are engaged in primary activities, it is quite natural that the main functions of cities should be to provide services to the primary sector. Exceptions to this rule would be a military post (Kingston), a government centre (Ottawa, Washington, Chandigarh (Punjab, India), and Canberra), and religious centres (Banares, now called Varanasi, India), that start growing on the basis of "autonomous" factors rather than on the basis of expansion of the primary sector. When a centre is a strong military post, capital, and a port all at the same time, its growth would be very vigorous (e.g., Kingston from 1840 to 1844, and London, England).

The growth of an urban system is likely to have positive effects on the income and employment of a regional economy, when the secondary and tertiary

¹J.G. Williamson *et al.*, "The Growth of Cities in the American Northeast 1820-1870", *Explorations in Entrepreneurial History*, Second Series, Vol. 4 (1966-1967), pp. 3-101, and E.E. Lampard, *op. cit.*, p. 17.

sectors become more important than the primary sector. At this stage, it is possible that some urban centres may become true growth centres, generating and disseminating growth impulses to their peripheral areas. However, as the process of industrialization gathers momentum, and the demand for skilled labour and other inputs becomes international or interregional, an increasingly larger proportion of spread effects will leak to places outside the region instead of staying within the region. The hinterland becomes less and less important and "economic space" becomes more diffused and defies regional boundaries. In due time, even the smaller centres in the urban hierarchy enter into an ever-widening economic space. In our study on economic linkages among the major centres of Eastern Ontario, it was found that the economic connections of places like Perth, Belleville, Brockville, Cornwall, and Trenton had become virtually worldwide.

XX.7 Summary

Although the population of Eastern Ontario has doubled since 1901, its relative share of the total population of Ontario has continued to decline. Between 1941 and 1971, a large part of this growth has been the result of the "natural increase" component of population increase. This is contrary to the situation in Central Ontario where a greater proportion of population change has resulted from the net in-migration component of population increase. The contribution of the "net migration" component of population change in Eastern Ontario has, however, risen since 1941, but the increase has not been consistent. In the case of Carleton County (now part of the Regional Municipality of Ottawa-Carleton), the larger part of the population change between 1961 and 1971 was due to net in-migration. This was mainly because of the expansion of the civil service in Ottawa.

Urban population has grown faster than the total population of the Region. The growth rate of urban population varied among various decades, the highest being in 1951-1961. The rates of rural-urban shift in general were almost the same as in 1851 to 1901. An increase in urban population in the case of the Ottawa area was largely due to migration of people from all parts of the country as well as other parts of the world. The increase in the urban population of small centres has been mainly from the natural increase of its existing population. The urban hierarchy of the Region is uneven and does not correspond to the rank-size rule, but it resembles "primate" size distribution, dominated by the Ottawa metropolitan area. Because of this, filtering or trickling down of economic growth impulses 'downward' from a centre of larger size to that of lower size becomes difficult.

Urbanization in the Region as a whole has not been the result of industrialization, as is commonly the case. It is rather the government sector that has had the most influence on the growth of urban population. Urbanization in the Region seems to be associated with the level of economic development, as the highly urbanized counties of Carleton and Frontenac are the most developed areas of the Region and the highly rural counties of Dundas, Glengarry and Prince Edward are the least developed parts of the Region.

Intra-Regional (Spatial) Aspect of Economic
Development of Eastern Ontario 1961-1971

XXI.1 Introduction

So far we have discussed the growth and development of various sectors of the Region. Very little has been said about the distribution of growth in general among the various spatial units of the Region. This chapter will first formulate the indices of economic development of various census divisions (13 counties and one regional municipality)¹, based on the growth of certain structural variables between 1961 and 1971, and in some cases based on their 1970 values, and then rank the performance of these census divisions on the basis of development indices. The technique of factor analysis² is used to formulate indices of development. While no effort will be made here to discuss the theoretical model of the factor analysis, a few words about the general technique are in order.

Factor analysis is one of the multivariate techniques. It is a generalized procedure for locating and defining dimensional space among a relatively large group of variables. It enables us to see if any underlying

¹Since the main purpose was to study the intra-regional aspect of the economic development of the Region, no need was felt to extend the analysis to all Ontario.

²For the theoretical underpinning and practical use of factor analysis, see Charles Spearman, "General Intelligence, Objectively Determined and Measured," American Journal of Psychology 1904, pp. 201-293; B.J.L. Berry, and D.M. Ray, "Multivariate Socio-Economic Regionalization: A Pilot Study in Central Canada," in T. Rymes and S. Ostry (eds.), Regional Statistical Studies (Toronto: University of Toronto Press, 1965); B.J.L. Berry, "Identification of Declining Regions: An Empirical Study of the Dimensions of Rural Poverty," in R.S. Thoman and W.D. Wood (eds.), Areas of Economic Stress in Canada (Kingston, Ontario: Industrial Relations Centre, Queen's University, 1965), pp. 22-72; J. Johnston, Econometric Methods, 2nd Edition (New York: McGraw Hill, 1972); and R.J. Rummel, Applied Factor Analysis (Evanston: Northwestern University Press, 1970); and Norman H. Nie et al., Statistical Package For Social Sciences (New York: McGraw Hill Book Company, 1975).

pattern of relationship exists such that the data may be "rearranged" or "reduced" to a smaller set of "factors" or "components" that may be taken as source variables accounting for the observed interrelations in the data.¹

Application of factor analysis involves three steps:

1. the preparation of a correlation matrix among various variables,
2. the extraction of the initial factors, and
3. the rotation of extracted factors for a terminal solution.

The first step is very simple and needs no explanation. The second step involves extracting new factors out of the original factors such that they are orthogonal, i.e., each new factor should be independent of the others. The contribution of each original variable to each component is called "loading". The third step involves transferring one factor solution to another - the search for simple and interpretive solution.

Useful as factor analysis may be, its results are sometimes difficult to interpret owing to measurement problems. The analysis is based on the assumption that all variables are measured in the same units. If not, it is difficult to attach a meaning to concepts such as the total variation and the partitioning of total variations into the contribution due to each component. This is not a serious drawback, as Johnston has pointed out that it can be overcome in various ways - one of which would be to standardize the variables by dividing them by the square root of the number of observations.¹ Furthermore, in some cases (as in our present study), the measurement of variables in different units does not create any major problem when the aim of the research is to rank the levels of development for different regional units.

The second difficulty with the technique is that factors that determine the values of observed variables are themselves unobservable and it

¹J. Johnston, op. cit., p. 326.

is not possible to know what they measure. This difficulty

is also not insurmountable as it is possible to make reasonable conclusions about the matter based on factor loadings. In this connection Hampton and Raynor suggest that, "... if it is clear from these loadings that in the main a particular factor only influences a certain variable, then a consideration of any common characteristics of these variables can sometimes throw light on what the factor is."¹

Thus, while factor analysis may have some problems of measurement and interpretation, it is quite useful in reducing the number of explanatory variables and enjoys an advantage over regression analysis where the degrees of freedom are small.

XXI.2 Objectives and Scope of the Factor Analysis

The main objective of the use of factor analysis in this chapter is to construct indices of economic health for each county/regional municipality of Eastern Ontario. These indices will then, be used to determine the relative growth position of each country/regional municipality in the growth hierarchy of the Region.

1

P. Hampton and A.C. Rayner, "The Use of Multivariate Methods in Economics with Reference to Regional Analysis," Regional Science and Urban Economics, Vol. 7 (1977), p. 274.

The second objective of the application of factor analysis is to determine the important factors in the economic growth of Eastern Ontario and to see if any pattern exists among these factors.

The index of economic health for Ontario counties was formulated by William H. Bell, and Donald Stevenson in 1964.¹ Their study covered all the existing 53 counties of Ontario for the period 1951-61. A similar analysis has been undertaken here except that it differs from that of Bell and Stevenson in the following respects:

- 1) Our analysis covers the period 1961-71 instead of 1951-61.
- 2) We have used first 17 variables and then 12 variables instead of 19 and 16 variables.
- 3) The definition of Eastern Ontario by Bell and Stevens differs from ours in that it includes the County of Peterborough in the Region.
- 4) The value of agricultural sales and manufacturing sales have been used as variables instead of retail trade because the data on retail trade at county level were not available for the year 1971.
- 5) A medical services variable has been added (i.e., availability of doctors per 1,000 persons).

Gerald Hodge also used the technique of factor analysis in his process of identification of "growth poles" in Eastern Ontario.³ He used the technique to identify the underlying structural features which distinguish the present

¹W.H. Bell and D. Stevenson, "The Index of Economic Health for Ontario Counties and Districts," Ontario Economic Review, Vol. 5, No. 2, (1964). No pagination.

²Choosing the period 1951-1971 would not have allowed comparison to be made between Bell and Stevenson's work and our work.

³G. Hodge, Identification of "Growth Poles" in Eastern Ontario, A Report to Ontario Department of Economics and Development (Toronto: 1966).

development of the urban centres of Eastern Ontario, to determine whether the structural features of present development are associated with the growth or the decline of urban centres in Eastern Ontario and, finally, to clarify the relationships which are both strategic and relevant in the formulation of public policy.¹

Hodge's analysis indicates that there are seven dimensions out of 32 variables, characterizing the urban development of the Region. They are: physical development, population growth, population size, industrial and commercial development, educational level and compact development. None of these aspects of urban development cluster on one factor² or dimension of the growth of the Region. This means that the growth of no single urban centre in Eastern Ontario can be adequately described without taking into account all the seven dimensions. It also implies that the existence of one condition does not require the existence of any other condition.

As indicated above, we have used 17 variables. Each variable, with the exception of two, refers to the period 1961 to 71. These two variables are agricultural sales and manufacturing sales. Their values cover the decade 1960-70. Our data are on census division level. City or town data would have been ideal, for that would have enabled us to identify directly urban centre(s) in which the growth of the Region is concentrated. Unfortunately, due to non-availability of data on certain variables at city or town level, we have had to restrict ourselves to county or regional municipality level. The variables included in the study and their units of measurement are given in Table 21.1.

¹Ibid., p. 4.

²The words "factor" and "dimension" are used interchangeably. A "dimension" is nothing but clustering of variables representing one particular trait of economic development.

TABLE 21.1

VARIABLE	UNIT
1. Agricultural Sales 1960-70 (AGRSALLES)	% change in real dollar values
2. Manufacturing Sales 1960-70 (MFGSALES)	%
3. Total Population 1971 (TOTPOP)	thousand
4. Population 1961-71 (POPGRW)	% change
5. Average Family Income 1971 (AFINCOIE)	dollars
6. Population Between 20-40 Years of Age (POP20T40)	% of total population
7. Employment Income More Than \$10,000, 1971 (EMPY10K)	% of total employment
8. Employment Income Less Than \$3,000, 1971 (EMPYLT3K)	% of total employment
9. Average Income of Employees in Manufacturing 1971 (AVEMFGTA)	dollars
10. Population Per One Doctor 1971 (POPDOCT)	absolute number
11. Immigrant Population 1971 (POPIMGT)	% of total population
12. Labour Participation Rate 1971 (LPDATES)	% of total population
13. Value Added Per Employee in Manufacturing 1971 (VANFGEPM)	dollars
14. Population with University Education 1971 (POPUNIV)	% of total population
15. Motor Vehicle Registration 1961-71 (MOTVEHCL)	% of total population
16. Urban Population 1971 (POPURBAN)	% of total population
17. Unemployment 1971 (UNEMPLOY)	% of total labour force

TABLE 21.2
Data on Various Census Divisions of Eastern Ontario, and
Ontario as a Whole

Counties	Units	Dundas	Frontenac	Glengarry	Grenville	Hastings	Lennox	Leeds	Lennox & Addington	Ottawa-Carleton	Prescott	Prince Edward	Renfrew	Russell	Stormont	Eastern Ontario	Ontario
Variables																	
1. AGRSALES	Percentage change in real terms	38.2	15.3	61.8	62.6	32.9	34.5	30.5	41.6	76.6	75.6	24.0	26.3	5.6	30.3	42.4	47.6
2. MFGSALES	Thousands	215.0	47.5	185.3	115.6	64.3	103.8	120.0	60.5	46.0	169.2	93.8	47.7	7.7	72.2	76.6	95.9
3. POPTOTAL	Percentage change	17.5	101.7	18.5	24.3	99.4	42.3	50.1	28.3	471.9	27.8	20.6	90.9	16.3	61.3	1070.9	7703.1
4. POPGROWT	Percentage change	1.7	15.1	-39	6.3	6.2	4.7	6.9	18.0	34.0	2.2	-2.2	1.4	5.6	5.9	16.3	23.5
5. AFINCOME	Dollars	8102	10221	7586	8894	9066	8880	9220	8641	12555	7684	7881	8553	8398	8694	8886	11065
6. POP20A49	Percentage of total population	34.2	41.6	31.4	35.5	36.9	34.8	36.2	36.6	42.3	34.3	33.2	36.7	34.4	36.3	30.0	40
7. EMPYK10K	**Percentage of total employment	7.79	11.3	6.8	7.3	8.9	7.5	8.2	8.8	19.2	7.6	6.6	7.9	8.1	8.0	8.8	13.89
8. EMPYLT3K	--DO--	35.87	32.6	39.7	33.6	33.7	34.7	34.5	34.2	28.2	37.6	60.2	33.5	31.2	35.0	34.6	31.41
9. AYENFGTA	Dollars	6100	8286	5549	7722	6385	5671	7186	7162	7842	6188	5458	5851	5170	7271	6559	6430
10. POPPOCT	Dollars	1087	264	1423	1116	785	763	1318	1816	432	1333	1000	1103	927	854	1015	595
11. POPIMGT	Percentage of total population	7.4	14.0	5.0	11.0	9.4	6.5	9.5	8.0	15.0	2.3	10.0	7.2	2.4	6.2	10.6	22
12. LPRATES	Percentage of total population	58.8	60.0	52.8	59.7	58.7	57.8	59.3	56.5	63.7	50.3	56.6	57.61	49.8	56.3	58.7	62.1
13. VAMFGPM	Dollars	22470	17137	14685	25112	14349	11864	18873	14073	12173	13627	19755	11291	10393	13909	16300	24800

TABLE 21.2 (cont'd)
Data on Various Census Divisions of Eastern Ontario, and
Ontario as a Whole

Counties	Units	Dundas	Frontenac	Glengarry	Grenville	Hastings	Lennox	Leeds	Lennox & Addington	Ottawa-Carleton	Prescott	Prince Edward	Renfrew	Russell	Stormont	Eastern Ontario	Ontario
Variables																	
14. POPUNIVY	Percentage of total population	4.5	8.78	4.38	5.2	4.06	3.67	6.14	3.85	13.5	3.88	3.97	5.00	2.55	4.41	5.09	6.2
15. MOTVEHCL	Percentage change	45.2	53.0	36.8	38.9	32.9	29.4	42.6	45.0	62.5	37.4	46.9	64.0	52.1	48.5	45.3	33.7
16. POPURBAN	Percentage of total population	34.9	72.3	17.5	39.0	67.5	62.4	52.0	30.9	90.9	48.8	23.6	62.0	39.0	76.8	72.7	82.3
17. UNEMPLOY	Percentage of labour force	3.6	7.0	6.6	6.0	7.1	5.1	5.6	6.2	5.8	8.6	7.3	8.4	6.01	9.7	6.4	6.9

Source: Statistics Canada various Census Publications

* Figures for Agricultural Sales have been deflated by the farm prices index for Eastern Canada and figures for Manufacturing Sales have been deflated by Manufacturing Industries Sales Index.

** Employment income includes income of Office Employees and Production Workers.

These variables can be divided into the following four categories:

- a) Demographic variables and social characteristics (variable number 3, 4, 6, 11, 16),
- b) Economic base variables (variable number 1, 2, 5, 7, 8, 9, 12, 13, 15, 17),
- c) Health variable (variable 10),
- d) Education (variable 14).

XXI.3 Calculation of Economic Health or Development Index

The variables are first ranked. Ranking of the variables on employment income of less than \$3,000 per annum, population per doctor and unemployment rate have negative ranking procedure, i.e., the larger the percentage of people having employment income of less than \$3,000, the lower would be their ranking and the higher would be the ranking index in absolute number. For example, in Table 21.2 the County of Prince Edward had the highest percentage of people with employment income of less than \$3,000. Its ranking index was 14 which means it had the lowest relative economic position in the whole of Eastern Ontario as far as employment income was concerned. Similarly, in the case of unemployment, the higher the percentage of unemployment in a particular county, the higher would be its ranking index and the lower would be its relative position in Eastern Ontario.

Table 21.2 contains data on 13 counties and one regional municipality in Eastern Ontario, Eastern Ontario as a whole and Ontario as a whole. From these data, one can see the picture of the structure of Eastern Ontario at the county level and the changes which have taken place in it over the decade 1961-1971. Eastern Ontario experienced a population growth rate higher than that witnessed by Ontario as a whole. Within the Region, the Ottawa-Carleton Regional Municipality had the highest population growth rate while

the counties of Glengarry and Prince Edward had negative growth rates. Agricultural and manufacturing sales in the Region experienced growth rates less than that of the Ontario economy as a whole. The Regional Municipality of Ottawa-Carleton had the highest growth rate in agricultural sales followed by Prescott and Grenville. The County of Dundas experienced the highest growth rate in manufacturing sales. Table 21.3 shows the ranking of counties for each of the variables. Averages of rankings by county indicate that Dundas, Russell and Glengarry are the least developed counties. However, this ranking procedure is not satisfactory as it gives same weight to all the ranks.

The next step is to find the association between every possible pair of these variables. Table 21.4 gives the correlation matrix of 17 variables. The closer the coefficient of correlation is to 1, the closer the relationship between two variables. For example, total population is more closely related to its growth rate than average family income. It means that in Eastern Ontario population growth is mainly accounted for by areas with a large population like Ottawa-Carleton, Kingston, and Belleville.

From the matrix of correlation coefficients, "factor loadings" are extracted. The factor loadings are the measure of the degree of closeness between variables and dimensions. With reference to our study, factor loadings can be interpreted as weightings used in grouping 17 variables into various factors or the contribution of each variable to each factor. Factor analysis was carried out with two sets of variables, first with 17 variables and then with 12 variables. Five variables dropped in the second case were population per doctor, university education, the labour force participation rate, urban population and unemployment rate. The selection of these five variables was guided by the consideration of comparing the results of this study with those undertaken in the past.¹ The removal of these five variables did not make any difference to our final analysis in the formulation of the economic

¹ W.H. Bell and D. Stevenson, *op. cit.*, no pagination.

TABLE 21.3
Ranking of Census Divisions

Counties	Dundas	Frontenac	Glengarry	Grenville	Hastings	Lanark	Leeds	Lennox & Addington	Ottawa-Carleton	Prescott	Prince Edward	Renfrew	Russell	Stormont
Variable														
1. AGRSALES	6	13	4	3	8	7	9	5	1	2	12	11	14	10
2. MFGSALES	1	13	2	5	9	6	4	10	13	3	7	11	14	8
3. POPTOTAL	13	2	12	10	3	7	6	8	1	9	11	4	14	5
4. POPGROWT	11	3	14	5	6	9	4	2	1	10	13	12	8	7
5. AFINCOME	11	2	14	5	4	6	3	8	1	13	12	9	10	7
6. POP20T49	12	2	14	8	3	9	7	5	1	11	13	4	10	6
7. EMPYM10K	9	2	13	12	3	11	5	4	1	10	14	8	6	7
8. EMPYLTK	11	3	13	5	6	9	8	7	1	12	14	4	2	10
9. AVENFCTA	9	1	12	3	7	11	5	6	2	8	15	10	14	4
10. POPPDOCT	8	1	13	10	4	3	11	14	2	12	7	9	6	5
11. POPINMGT	8	2	12	3	6	10	5	7	1	14	4	9	15	11
12. LPRATES	5	2	12	3	6	7	4	10	1	13	9	8	14	11
13. VALFGRPM	2	5	6	1	7	12	4	8	11	12	3	13	14	9
14. POPUNIVY	9	2	6	3	8	13	7	12	1	11	10	4	14	5
15. MOTVEHCL	7	3	12	10	13	14	9	8	2	11	6	1	4	5
16. POPURBAN	11	3	14	10	4	5	7	12	1	8	13	6	9	2
17. UNEMPLOY	1	9	8	6	10	2	3	7	4	15	11	12	5	14

TABLE 21.4

CORRELATION COEFFICIENTS

	AGRSALTS	MFGSALES	PGPTOTAL	POPGRWT	AF INCOME	POP2CT49	EMPVMI0K	EMPVLTJK	AYEMFGTA	POPPRODCT
AGRSALTS	1.00000	0.47669	0.38420	0.25550	0.18613	0.01210	0.32579	0.06006	0.23225	0.21875
MFGSALES	0.47669	1.00000	0.15407	-0.41957	-0.47743	-0.56713	-0.34673	0.65577	-0.20908	-0.41048
PGPTOTAL	0.38420	0.15407	1.00000	0.82224	0.90957	0.75429	0.06529	-0.66620	0.45469	-0.54079
POPGRWT	0.25550	-0.41957	0.82224	1.00000	0.90957	0.85720	0.91332	-0.74609	0.69223	-0.37415
AF INCOME	0.18613	-0.47743	0.90957	0.90957	1.00000	0.90311	0.94304	-0.40329	0.67406	-0.63975
POP2CT49	0.01210	-0.56713	0.75429	0.85720	0.90311	1.00000	0.83207	-0.78403	0.75375	-0.63136
EMPVMI0K	0.32579	-0.34673	0.06529	0.91332	0.94304	0.83207	1.00000	-0.72471	0.55569	-0.49956
EMPVLTJK	0.06006	0.65577	-0.66620	-0.74609	-0.40329	-0.78403	-0.72471	1.00000	0.49640	-0.30586
AYEMFGTA	0.23225	-0.20908	0.45469	0.69223	0.67406	0.75375	0.55569	0.49640	1.00000	-0.52497
POPPRODCT	0.21875	-0.41048	-0.54079	-0.37415	-0.63975	-0.63136	-0.49956	-0.30586	-0.52497	1.00000
POP1MGT	0.21475	0.41048	0.61730	0.67259	0.76987	0.74545	0.64336	-0.42128	0.20172	0.12664
LPDATES	0.17777	0.23478	0.01765	-0.17302	-0.07383	-0.16242	-0.08436	0.30420	0.59119	0.13864
VAMFGEM	0.11152	0.50918	0.21671	-0.21579	-0.15514	-0.16242	-0.25746	0.93187	0.64319	0.64413
POPUNIV	0.17625	-0.34637	0.91413	0.83497	0.90542	0.82198	0.93187	0.50328	0.59119	0.64413
MOTVEHCL	0.18008	0.31483	0.53930	0.63479	0.47458	0.54779	0.51877	0.50328	0.59119	0.64413
POPURBAN	0.01662	-0.48056	0.63129	0.63416	0.75417	0.80404	0.66670	0.64600	0.52828	0.71425
UNEMPLOY	-0.01826	-0.28036	-0.00681	-0.16479	-0.16510	0.04100	-0.13114	0.18837	0.02762	-0.01667

	POP1MGT	LPDATES	VAMFGEM	POPUNIV	MOTVEHCL	POPURBAN	UNEMPLOY
AGRSALTS	0.07822	-0.17777	0.11152	0.17925	-0.18008	0.01862	-0.01826
MFGSALES	-0.27185	-0.21478	-0.50918	-0.26939	-0.51443	0.44056	-0.28036
PGPTOTAL	0.61730	0.03665	-0.29671	0.91413	0.52910	0.69129	-0.04491
POPGRWT	0.63259	-0.17302	-0.21579	0.80497	0.44779	0.60416	-0.14876
AF INCOME	0.76987	-0.07383	-0.15514	0.90542	0.47458	0.75417	-0.14876
POP2CT49	0.74545	-0.06747	-0.15242	0.82198	0.54779	0.80404	-0.13114
EMPVMI0K	0.83207	-0.08403	-0.30400	0.93197	0.54779	0.66670	-0.01826
EMPVLTJK	0.42128	-0.10319	0.27319	-0.58328	0.50417	0.68620	0.18837
AYEMFGTA	0.20172	-0.06163	0.11684	-0.60413	-0.33453	0.52928	0.0762
POPPRODCT	0.52497	-0.06284	-0.35462	-0.76457	0.13043	0.71425	-0.01662
LPDATES	0.06008	1.00000	-0.29879	-0.00895	0.52606	0.14466	-0.20582
VAMFGEM	0.35662	-0.20479	1.00000	-0.06841	0.23247	0.34346	-0.32404
POPUNIV	0.76458	-0.00895	-0.06841	1.00000	0.54992	0.62307	-0.05511
MOTVEHCL	0.33349	0.52606	0.23247	0.54992	1.00000	0.35988	0.18781
POPURBAN	0.43679	0.14446	-0.35676	0.62507	0.35288	1.00000	0.35959
UNEMPLOY	-0.20582	0.14446	-0.35676	-0.05531	0.18786	0.25559	1.00000

health index because the remaining 12 variables, which were mostly related to the economic base, had a very heavy loading. The detailed tables of the analysis involving 12 variables are not, therefore, reported here. However the development indexes based on 12 variables are calculated along with those based on 17 variables (See Table 21.8).

Tables 21.5, 21.6, 21.7 show results of principal factoring without iteration (PA1). Table 21.5 gives eigen values (i.e., a measure of variance accounted for by a factor) and the percentage of variance accounted for by each of the five factors. About 51 per cent of the total variance is explained by principal factor. The remaining variations between the characteristics of the counties are explained by other (unique) factors. Variables with asterisks are significant from zero. Clearly there are five dimensions to the development of Eastern Ontario. Each of them can be labelled according to the pattern of characteristics having loadings of more than .4.¹

The final step is to prepare the economic health index of each county/regional municipality on the basis of factor loadings. The health or growth index of each county/regional municipality based on the first principal factor is calculated from the following model.

$$HI_i = \sum_{j=1}^{17} a_j R_{ji} \quad i = 1 \text{ ---- } 14 \quad J = 1 \text{ ---- } 17 \quad (21.1)$$

HI_i is economic health index of census division (county/regional municipality)

R_{ji} is rank value of variable j of census division (county/regional municipality) i

a_j is factor loading of variable j

In other words, the economic health index for each census division is equal to the sum of the census division's rank for every variable times the corresponding

¹Following M.I. Logan, "Spatial Dimensions of Economic Development, the Case of the Upper Mid-West," *Regional Studies*, Vol. 4 (1970), pp. 117-125; and B.J.L. Berry, "Identification of Declining Regions," *op. cit.*, p. 30, factor loadings below .4 are considered insignificant.

Table 21.5

Factor Analysis of Economic Development of Eastern Ontario

Variable	Estimated Communality	Factor	Eignvalue	Percent of Variance	Cumulative Variance
AGRSALES	1.00	1	8.7039	51.2	51.2
MFGSALES	1.00	2	2.6430	15.5	66.7
POPTOTAL	1.00	3	1.4453	8.5	75.2
POPGROWT	1.00	4	1.1857	7.0	82.2
AFINCOME	1.00	5	1.0555	6.2	88.4
POP20T49	1.00	6	0.8009	4.7	93.1
EMPYMI0K	1.00	7	0.5032	3.0	96.1
EMPYLT3K	1.00	8	0.2993	1.8	97.9
AYEMFGTA	1.00	9	0.2003	1.2	99.0
POPPDOCT	1.00	10	0.1001	0.6	99.6
POPIMMGT	1.00	11	0.0377	0.2	99.9
LPRATES	1.00	12	0.0192	0.1	100.0
VAMFGPEM	1.00	13	0.0059	0.0	100.0
POPUNIVY	1.00	14	0.0001	0.0	100.0
MOTVEHCL	1.00	15	0.0000	0.0	100.0
POPURBAN	1.00	16	0.0000	0.0	100.0
UNEMPLOY	1.00	17	0.0000	0.0	100.0

Table 21.6

Factor Loadings, Using No Iterations

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Communality (Five Factor)
AGRSALES	0.1389	0.5743	0.7672*	0.0967	0.0509	.9497
MFGSALES	-0.5534	0.6383*	0.2757	0.1422	0.0397	.8115
POPTOTAL	0.9013*	0.0683	0.3227	-0.0619	0.1044	.9358
POPGROWT	0.9054*	0.1517	0.0900	-0.1803	0.0760	.8891
AFINCOME	0.9785*	0.1256	-0.0134	-0.0930	0.0312	.9831
POP20T49	0.9523*	-0.0423	-0.1334	0.0966	-0.0915	.9442
EMPYMI0K	0.9406*	0.1244	0.2144	-0.1295	0.1102	.9752
EMPYLT3K	-0.8196*	0.1845	0.1256	0.2666	-0.1697	.8214
AYEMFGTA	0.6919*	0.3669	-0.1647	0.3241	-0.2746	.8208
POPPDOCT	-0.6619*	0.1200	0.3309	0.0953	0.2736	.6459
POPIMMGT	0.7423*	0.3630*	-0.3300	0.3117	0.0441	.8908
LPRATES	0.0277	-0.6475*	0.1626	0.5034	0.3789	.8434
VAMFGPEM	-0.2124*	0.7096	-0.4369	0.4474	0.0759	.9454
POPUNIVY	0.9120	0.2121	0.1753	0.1463	0.0582	.9324
MOTVEHCL	0.5846*	-0.4420	0.0201	0.3618	0.4366	.8590
POPURBAN	0.7984*	-0.2472	0.0397	-0.0272*	-0.3745	.8412
UNEMPLOY	-0.0248	-0.5530	0.3053	0.4429	-0.5903	.9443

* Highest Factor Loading for that Variable.

factor loadings for each variable. The health index for each census division based on 17 and 12 variables is given in Table 21.9.

Since the variables' ranks weighted by corresponding factor loadings are summed, it is clear that the lower the index of the census division, the healthier it is or the higher the growth it experiences. If the index is minus, the larger the number, the healthier the census division is.

XXXI.4 Discussion and Conclusions

From Table 21.6, it is obvious that the dimensions of economic growth of Eastern Ontario are dominated by economic and demographic factors, which have the highest factor loadings. For example, total population, population growth, average family income, employment income of \$10,000 or more, and population between 20 and 49 have factor loadings of more than .90. Factor loadings for unemployment rates, population per doctor and employment income below \$3,000 are negative because they constitute indicators of poverty. Factor loadings for manufacturing sales are difficult to interpret as they are significantly negative (in Column 1) and positive (in Column 2). Table 21.7 indicates the pattern of variables in various factor loadings, derived after rotating factor axes in such a way as to obtain the maximum concentration of variables in various groups. It differs from Table 21.6 in that it constrains variables to load significantly on a single factor, while in the case of Table 21.6, significant loadings may be on more than two factors, making it difficult to interpret the loadings of variables. However, the results of Table 21.7 are not significantly different from those of Table 21.6, i.e., rotation of factors does not improve factor loadings.

Table 21.7

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Varimax Rotated Factor Matrix

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	$\sum R$
AGRSALES	0.2759	0.9222	0.0002	-0.1395	0.0602	.95
MFGSALES	-0.4481	0.6630	0.2826	-0.2515	-0.1672	.81
POPTOTAL	0.9278	0.1813	-0.1321	0.1571	-0.0086	.94
POPGROWT	0.9338	0.0108	-0.0435	-0.0037	-0.1230	.89
AFINCOME	0.9842	-0.0835	0.0565	0.0265	-0.0599	.98
POP20T49	0.9078	-0.2416	0.1513	0.1251	0.1520	.94
EMPYMI0K	0.9705	0.1057	-0.0886	0.0828	-0.0864	.97
EMPYLT3K	-0.7917	0.3389	0.1845	-0.1333	0.1673	.82
AYEMFGTA	0.6839	0.0098	0.5399	-0.1040	0.2251	.82
POPPDOCT	-0.6181	0.4602	-0.0778	0.1231	-0.1758	.65
POPIMMGT	0.7115	-0.1047	0.6040	0.0685	-0.0645	.89
LPRATES	-0.1040	-0.0812	-0.1262	0.8773	0.2007	.84
VAMFGPEM	-0.2041	0.1426	0.8978	-0.1503	-0.2338	.95
POPUNIVY	0.9228	0.1726	0.1614	0.1546	0.0336	.93
MOTVEHCL	0.4695	-0.1804	-0.0104	0.7783	0.0159	.86
POPURBAN	0.7655	-0.2409	-0.1273	-0.0096	0.4254	.84
UNEMPLOY	-0.1016	-0.0128	-0.1519	0.2153	0.9298	.94

Note: Following Irma Adelman, a variable having loadings on two factors which are not significantly different is assigned to that factor which is judged to have the closest affinity. See Irma Adelman and Cynthia Taft Morris, Society, Politics and Economic Development (Baltimore: The Johns Hopkins Press, 1967), p. 186. Also, where one variable loads on two factors and the difference between two loadings is significant, the loading with the highest value is chosen.

Five dimensions of development of Eastern Ontario can be identified from the varimax table of factor loadings (Table 21.7). These five dimensions have been classified according to the interpretation suggested by those variables which are prominent in each cluster. The five dimensions identified are as follows:

- 1) Population and income (factor 1)
- 2) Commerce (factor 2)
- 3) Industries (factor 3)
- 4) Labour force participation (factor 4)
- 5) Urban unemployment (factor 5)

Among these five dimensions, the first three are the most important. Their clusterings are more intense. The development dimension of population and income has significant loadings on several variables, viz., total population, population growth, average employment income, population between twenty to forty years of age, immigrant population, education, and urban population. Manufacturing sales and population per doctor also have significant loadings but negative in sign. The second dimension has significant factor loadings on manufacturing sales, agricultural sales and population per doctor. The third dimension contains high loadings on average family income, immigrant population and value added in manufacturing. The remaining two dimensions contain labour force participation rates, motor vehicle registration, urban population and unemployment. Taken together, 88.4 per cent of variation is explained by these five dimensions. Out of this, about 51 per cent is explained by the first principal component.

Development indexes for Eastern Ontario, by census division are given in Table 21.8. It may be repeated here that since the development index for each census division is the sum of that census division's rank of every variable

C TABLE 21.8
Development Indexes for Eastern Ontario by
Census Division, 1961-1971

Census Division	Based on 17 Variables		Based on 12 Variables	
	Development Index	Rank	Development Index	Rank
Ottawa-Carleton	-1.920	1	-1.768	1
Frontenac	9.276	2	8.652	2
Hastings	32.110	3	25.191	3
Leeds	32.112	4	27.585	4
Stormont	33.491	5	28.430	5
Lennox & Addington	38.465	6	31.900	6
Renfrew	40.589	7	39.747	7
Grenville	44.858	8	41.647	8
Lanark	64.183	9	50.119	9
Russell	67.789	10	55.636	10
Prescott	68.274	11	57.608	11
Dundas	71.233	12	59.884	12
Prince Edward	74.939	13	62.377	13
Glengarry	77.890	14	73.958	14
Average Value for the Region	46.600	7.500	40.07	7.500
Median Value for the Region	42.720	7.500	40.69	7.500
Standard Deviation	24.000	4.183	20.70	4.183

Source: Author's Research

times the corresponding factor loadings, the smaller the index, the healthier the census division. Table 21.8 indicates that Ottawa-Carleton Regional Municipality has the smallest development index (-1.920) which means the highest level of economic development. The counties of Frontenac and Hastings come next after Ottawa-Carleton. The poorest county in Eastern Ontario is Glengarry, followed by Prince Edward and Dundas. Its development index is 77.89. The average development index for the whole Region is 46.6 which is quite close to its median value. The distribution of development indexes is very wide-ranging. This extreme distribution of development is evident from the high standard deviation of development indexes. Based upon the distribution of development indexes, the 13 counties and one regional municipality of Eastern Ontario can be classified in the following five groups which appear to be the same as those prepared by the Economic Atlas of Ontario, covering the period 1951-1961.¹

TABLE 21.9

Comparison of Index of Economic Development
of Census Divisions of Eastern Ontario

	1961-71 Census Divisions	RANK	1951-61 Census Divisions	RANK
GROUP I	Ottawa-Carleton, Frontenac	1	Ottawa-Carleton, Frontenac	1
GROUP II	Hastings, Leeds, Stormont	2	Hastings, Leeds, Renfrew	2
GROUP III	Lennox and Addington, Renfrew, Grenville	3	Stormont, Grenville	3
GROUP IV	Lanark, Russell, Prescott	4	Lanark, Lennox & Addington Prince Edward	4
GROUP V	Dundas, Prince Edward, Glengarry	5	Russell, Prescott, Glengarry, Dundas	5

¹ W.G. Dean (editor), Economic Atlas of Ontario (Toronto: The University of Toronto Press, 1969).

The above comparison is marked by two contrasts. First, the counties of Stormont, Lennox and Addington and Russell improved their groupings from lowest third to lowest second, lowest fourth to lowest third and lowest fifth to lowest fourth respectively. Second, the grouping of the counties of Renfrew and Prince Edward went down from second to third and fourth to fifth respectively. These are minor shifts and they may be due to differences in variables included in our study and the study of the Economic Atlas of Ontario. Groupings of counties based on a development index derived from 12 variables were also formulated. It was observed that the reduction in the number of variables by five, unemployment, urban population, education level, population per doctor, and labour participation rates did not make much difference. This was because of the strong loadings on population variables and income variables. They explained more than 50 per cent of the total variation in 17 variables of economic development.

Table 21.9 shows that with the exception of Prince Edward, almost every county located to the North-West and the South-West of Ottawa-Carleton had a higher ranking than their counterparts located to the East and the South-East of Ottawa-Carleton. What does that imply in terms of spread effects of the growth of major urban centres such as Ottawa and Kingston? It implies that counties of Eastern Ontario, which are relatively nearer to Toronto, have relatively more economic development than that of the counties farther away from Toronto. "Spread effects" of Toronto's development travel at least to Kingston and then they slow down. Ottawa-Carleton is not very much affected by the development of Toronto.

The propulsive effects of Ottawa do not seem to be transmitted very far. Even the neighbouring counties have very low groupings in Table 21.9. For example, the surrounding counties of Dundas, Glengarry, Prescott and Russell

located to the East and the South-East of Ottawa are the poorest counties in the Region. Only the County of Stormont, which is within 50 miles of Ottawa and which has Cornwall as its major manufacturing centre, had a favourable grouping. From this one can imply that Ottawa is not an effective growth centre. Further, a survey (discussed earlier, in Chapter XVII) of the manufacturing sector in Eastern Ontario showed that less than 20 per cent of all manufacturing units looked to Ottawa for their raw materials and only a small percentage of them had their markets for their products in the Ottawa-Hull area.

Conclusions: Based on the economic study of the Region between 1961 and 1971, it may then be concluded that the structure of the Eastern Ontario Planning Region is very uneven spatially and, thus, it cannot be called a homogeneous region.¹ Ottawa-Carleton and the County of Frontenac, are growing fast, while the counties of Glengarry and Prince Edward are declining or stagnant. The growth rate of Eastern Ontario is still below the provincial average growth rate. Agriculture is still the mainstay of the Eastern counties of the Region. Perhaps with the exception of Stormont, all the Eastern counties are the poorest of all. It may, then, be concluded that rural farm poverty in Eastern Ontario still prevails as the most agrarian and least urbanized counties are the least developed ones (Table 21.10). For example, Glengarry and Russell are the counties having the lowest level of economic development and these are the counties where 25-30 per cent of the population is still farm population as compared with the regional average of

¹ It was one of the tasks of the thesis to find out whether the planning unit of Eastern Ontario is or is not homogeneous. See Chapter I for explanation.

TABLE 21.10
Distribution of Farm Population, Eastern Ontario 1971

Census Division	Farm Population	Total Population	Percentage of Farm Population & Total Population	Develop- ment Rank
Dundas	10,542	66,608	15.8	9
Frontenac	5,221	101,692	5.1	2
Glenora	5,178	18,480	28.0	13
Grenville	3,440	24,316	14.1	8
Hastings	7,666	99,393	7.1	4
Lamark	5,359	42,259	12.7	7
Leeds	5,742	50,093	11.4	6
Lennox & Addington	4,778	28,359	16.8	10
Ottawa-Carleton	8,296	471,936	1.75	1
Prescott	5,536	27,832	19.9	12
Prince Edward	3,951	20,640	19.1	11
Renfrew	8,341	90,875	9.2	5
Russell	3,886	16,287	23.8	14
Stormont	4,198	61,302	6.8	3
Eastern Ontario	82,134	1,120,072	7.3	
Ontario	391,715	7,703,106	5.0	

Source: Canada, Statistics Canada, 1971, Census of Canada, Agriculture,
Ontario, Vol. 4.2 (Ottawa: Information Canada, 1973).

TABLE 21.11
Percentage Distribution of the Population by Mother
Tongue, for Census Divisions of Eastern Ontario, 1971

Census Division	Percentage		
	English	French	Other
Dundas	91.7	3.8	4.5
Frontenac	91.0	2.0	6.9
Glenora	53.0	44.2	2.8
Grenville	91.0	2.9	5.8
Hastings	94.6	1.8	3.6
Lamark	96.0	1.5	2.2
Leeds	94.4	1.7	3.9
Lennox & Addington	96.1	1.2	2.7
Ottawa-Carleton	70.8	20.8	8.4
Prescott	17.6	81.2	1.2
Prince Edward	96.2	0.8	3.0
Renfrew	87.2	5.3	7.6
Russell	15.0	83.8	1.3
Stormont	58.2	37.5	4.4
Eastern Ontario	74.13	15.44	10.43

Source: Canada, Statistics Canada, 1971, Population Census of Canada,
Population Specified Mother Tongues, for Census Divisions and
Subdivisions, Cat. No. 92-772, (Ottawa: 1972), pp. 2-45 and 2.63.

7.3 per cent and provincial average of 5 per cent. This conclusion is very close to that of Professor Berry who identified areas and types of rural poverty in Ontario (discussed earlier in Chapter XVI).¹

Another pattern of poverty may also be noticed, viz., the majority of the countries where more than 40 per cent of the population is French speaking, are in the lowest groupings. Glengarry, Russell and Prescott are the counties where French is the mother tongue of more than 40 per cent of the people, and these are the counties which have been found to be among the two lowest groupings established by factor analysis (Tables 21.8 and 21.11).

Finally, counties which are to the West and South-West of Ottawa, are highly developed. The counties to the West of Ottawa are less urbanized and industrialized than those in the East (with the exception of Stormont, which includes Cornwall). In terms of spread effects, the economy of Ottawa as a regional growth centre has failed to transform the eastern counties of the Region from stagnant or declining counties into growing ones.

¹B.J.L. Berry, op. cit., p. 23.

CHAPTER XXII

Summary of Conclusions

What can be concluded from the foregoing story of the economic development or decline of the Region since its settlement? It seems that the early growth of the Region was initiated by British government policy in establishing garrisons and in settling United Empire Loyalists. A further stimulus to early growth in the nineteenth century came from a combination of external demand for products of the Region's massive forests, waterways and technology which made possible the exploitation of these resources. The square-timber trade to the U.K. not only developed the forestry sector but also (through various linkages) stimulated the growth of other sectors of the Region such as agriculture and manufacturing. The natural waterways of the Region gave its products access to markets and at the same time made possible the shipment of supplies and manufactured goods to settlers and those engaged in the exploitation of forest resources. They also provided a source of water power for manufacturing. Transshipment activities at rapids and falls contributed to the growth of cities such as Kingston and Prescott. Because of early settlement and several natural advantages, Eastern Ontario in this period enjoyed an era of prosperity, compared with other regions of Southern Ontario.

In the second period, the external demand for forest resources continued to dominate the development of the Region. Though the British demand for square timber was declining as a result first of reduction and then elimination of preferential duties, the American demand for sawn-lumber helped but, not created by, the Reciprocity Treaty of 1854-1866 and the Civil

War of 1861-1865, made up for the slackening of square-timber exports.

The sawn-lumber trade to the U.S.A. was also helped by the Rideau Canal. Ottawa was the first area to benefit from the expansion of the sawn-lumber trade. Abundance of water power provided by the Rideau and Chaudière Falls gave a natural advantage to sawmills located in Ottawa. In addition to the sawn-lumber trade, the rise of American demand for field crops benefitted mainly the St. Lawrence Valley region, the land of which is very fertile for field crops. Cheese and butter exports benefitted both the St. Lawrence and the Ottawa Valley regions. As a result of the American demand for agricultural products, agricultural exports in the Region were diversified.

The exhaustion of white pine resources forced the movement of the forest frontier out of the Region towards the northwest. Movement of the forest frontier affected adversely the growth of the local market for agricultural products, especially in the Ottawa Valley, which depended on lumbering for a market.

The change from a technology based on wood, wind and water to one based on coal, steam and iron stripped the Region of its natural advantages over the other regions of Southern Ontario. Commercial use of steam power and the arrival of railroads made it unnecessary to locate plants near waterfalls and local markets, respectively. These changes in technology favoured Toronto and other major urban centres of Central Ontario. The scattered manufacturing establishments in Eastern Ontario, based on local resources and demand, gave way to concentrated and localized establishments in Central Ontario. Consequently, manufacturing growth in Eastern Ontario slowed down and in some urban areas, manufacturing had an absolute decline in the absence of any offsetting modern industries.

Canal construction was a mixed blessing for the development of the Region. On the one hand, the construction of canals such as the Rideau created spread effects in the form of demand for labour and materials, opened hinterland of various parts of the Region, and gave access to market in the U.S.A.; on the other hand they (e.g., the St. Lawrence Canals) reduced the level of transshipment activities at the ports of Kingston and Prescott. The reduction in transshipment activities brought a decline in the growth of economic activities associated with them.

Between 1851 and 1901, certain sectors of the economy, such as forestry continued to expand, while others like manufacturing (with the exception of sawmilling) suffered a relative slowdown in growth rates, especially at the close of the century. Diversification of agriculture to dairy and livestock farming offset some of the effects of the decline of the local shantymarket and the effects of the slowly-growing manufacturing sector. The expansion of the government sector because of political decisions of the selection of Ottawa as the site for the national Capital and Confederation of the British North American Colonies also provided impetus to the growth of the Ottawa area. Despite its rapid growth, the government sector did not act as a leading sector in the economic development of Eastern Ontario. The Region in general experienced a slow growth when compared with the other regions of Southern Ontario, which were now enjoying the benefits of frontier movement towards the Western part of Ontario.

In the third period, the propulsive power of external demand has almost ceased.

Overlapping the disappearance of the square-timber trade and the declining trend of the lumber trade, the pulp and paper industry made its appearance. The early growth of the industry was based on an abundant supply of pulp wood which was of little use for sawn-lumbering, and the

natural waterways that were used for floating logs to mills and for direct-drive water power. The growth of the industry received an impetus with improved mechanical and chemical processes, the use of hydroelectric power, and the rising demand for newsprint. Though the pulp and paper industry is currently the third largest manufacturing industry in the Region by the measure of value added and fifth largest by the level of employment, it cannot be called the "dominant" or "staple" industry of the Region.

At the turn of the nineteenth century, the technology of hydroelectric generation gave the Region some new advantages, but did not offset the industrial advantages of Central Ontario with the possible exception of tourism. The invention of the internal combustion engine has not conferred any special advantage on the Region. The construction of the St. Lawrence Seaway has also affected adversely the growth of the Region. Since its opening, the Region's ports have lost a substantial amount of income as a result of a decline in transshipment activities. It is possible that air transportation has favoured other parts of Southern Ontario, but not Eastern Ontario.

Diversification of agriculture to dairying and livestocking that began in the second half of the nineteenth century when sawn lumber exports were dominant, continued to take place through the twentieth century. Dairy and beef products currently exceeds in value the output of all field crops. Though yield per cultivated acre of field crops in the Region has experienced some growth, it is still lower than that in other regions of Southern Ontario, mainly because of the poor soil of a large part of the Region.

The manufacturing sector in Eastern Ontario still relies heavily on traditional industries with unfavourable industry mix. Recently, however, some high technology industries such as electronics and computer manufacturing and servicing have made their appearance in the Ottawa area. These industries depend on foreign demand and on the federal government in Ottawa for a market for their products and for research facilities.

The Region no longer possesses any major export staple. Consequently, the situation of "no staple , no growth" seems to apply. The government sector accounts for the largest part of total economic activity in the Region. However, it is not an engine of economic growth for the Region as a whole, as it is concentrated mostly in Ottawa, Kingston, Chalk River and Trenton, and its spread effects are weak for the most part.

Tourism/recreation is a new element in the growth of the Region. It is the third largest contributor to the income of the Region, next to government and manufacturing. It is labour intensive and dispersed, and its effects are not limited to one place.

Analysis of spatial and economic linkages indicates that the Region is not "well knit" either geographically or economically. Geographically, the Region consists of three sub-regions with their distinct features and problems. Each of the sub-regions has a different terrain and specializes in different types of farming. It is because of these differences in geography and economic activities that Eastern Ontario is not a homogeneous unit; rather it comprises three functionally and economically weakly linked units which have been put together to form an administrative unit. Industrial units in the Region are not well integrated and interlinked or interdependent. Their inter-industry as well as spatial linkages are weak. As a result,

spread effects from one industrial unit to another in the Region are also very weak. A significant proportion of spread effects leaks out of the Region.

Some parts of Eastern Ontario are, however, linked more closely economically, geographically and culturally with adjacent areas on both sides of the border in Quebec and in Central Ontario than internally. This is corroborated by a recent study made for the Economic Council of Canada.¹

The history of settlement and economic development in the three periods shows that the three sub-regions of Eastern Ontario have depended on different factors in varying degrees for their economic growth, and the economic ties among them have also differed. In the first period, it was mostly the square-timber trade that stimulated the growth of the Ottawa Valley; while the growth of the St. Lawrence Lowlands largely depended on settlement and agriculture, the government sector, and traffic on the St. Lawrence, and to a lesser extent on the timber trade. The Shield sub-region was not yet fully settled. However, there existed some economic ties between the Ottawa Valley and the St. Lawrence; the latter shipped food for the shanty markets in the former. In the second period of economic development, the Ottawa Valley, and to some degree the St. Lawrence, prospered as a result of the sawn-lumber trade with the U.S.A. Exports of field crops from the St. Lawrence Lowlands and of dairy products from both these regions to the U.S.A. were common factors in their growth. However, other economic ties had diminished

¹ Michel Boisvert, The Correspondence Between the Urban System and the Economic Base of Canada's Regions (Ottawa: Economic Council of Canada, 1978), pp. 143-155. While devising a system of 20 regions for Canada, this study includes in the Ottawa area not only the surrounding Eastern Ontario counties but also four counties in Quebec. On the other hand, some of the eastern counties of Eastern Ontario are included in the Montreal Region, while those located in the West are included in the Toronto Region.

between these two regions owing to rising domestic demand for field crops in the St. Lawrence Lowlands. On the other hand, trade connections between these sub-regions had increased as a result of the sawn-lumber and dairy product trades from the Ottawa Valley to the U.S. via the Rideau canal to Kingston, but these trade connections did not have any significant spatial economic impact on these sub-regions, except the Kingston area, as they had their final linkages to the U.S.A.

Currently, the economic growth of the Ottawa Valley depends largely on the growth of the government sector and tourism and recreation; while that of the St. Lawrence Valley depends on manufacturing, tourism and agriculture, and to a limited extent on the government sector. There are, however, few significant economic ties between these two sub-regions. Manufacturing and retail services in the St. Lawrence depend on Toronto or Montreal for sophisticated services, whereas some eastern parts in the Ottawa Valley look to Montreal for their economic sophisticated purchases. The Shield area too is weakly connected with either the Ottawa Valley or the St. Lawrence Lowlands. From this, it becomes clear that even historically there has not been much economic linkage among the three sub-regions of Eastern Ontario. Whatever links existed among them were mainly based on forest and farm operations. With the disappearance of the forest frontier, new links among them also weakened. The rise of tourism has, however, established the links among them, though to a limited extent. Currently, the Region is neither internally integrated nor self-contained. This may be the reason why the various development strategies of various governments have not borne more fruit.

Another point that comes out of this research is that the slow growth of the Region in relation to other Regions of Southern Ontario is not

a new thing. It began in the second half of the last century with the movement of forest and settlement frontiers to the west. Its growth was further weakened by the loss of certain natural advantages it has possessed earlier over the other regions of Southern Ontario with the invention of the steam engine and the arrival of railroads.

Possible Theoretical Interpretations of the History of Economic Development of Eastern Ontario

Does the foregoing discussion of the factors that determined the development of the Region show that this development fits into the framework of any single theory or any set of theories of regional economic development? There are several approaches¹ to regional economic development. Most of them are adaptation of macroeconomic models used in aggregate growth theory. In our case, only those approaches are examined that are not restrictive in terms of their assumption (e.g. the neo-classical growth theories and Harrod-Domar models and that seems relevant to the development of Eastern Ontario. Our decision to choose a few of them was also guided by recent emphasis on spatial and intraregional aspects of regional growth.²

The first approach used is that of the export-base thesis or staple export model.³ In its simplest form, the staple export theory states that regional

¹ Among them, mention may be made of: Staple thesis, neo-classical growth models, Stages theory, Harrod-Domar model of economic growth, unbalanced growth theory of Schumpeter, growth poles theory and cumulative causation theories of Myrdal and Hirschman.

² For the evaluation of various regional growth theories, see Harry W. Richardson, "The State of Regional Economics: A Survey Article", International Regional Science Review, Vol. 3, no. 1 (1978), pp. 1-48; and Edwin Von Boventer, "Regional Growth Theory", Urban Studies (1975), Vol. 12, pp. 1-29.

³ There is a voluminous literature on various versions of export-base theories and the export staple model. For instance, see W.T. Easterbrook, and M.H. Watkins (editors), Approaches to Canadian Economic History, Carleton Library No. 32 (Toronto: McClelland and Stewart Limited, 1967); A.D. Scott, "Policy for Declining Regions", in W.D. Wood and R.S. Thoman (editors), Areas of Economic Stress in Canada (Kingston: Industrial Relations Centre, Queen's University, 1965), pp. 73-98; H.A. Innis, The Fur Trade in Canada: An Introduction to Canadian Economic History (New Haven: Yale University Press, 1931); H.A. Innis, Problems of Staple Production in Canada (Toronto: The Ryerson Press, 1933); M.H. Watkins, "The Staple Theory Revisited", Journal of Canadian Economic Studies, Vol. XII, No. 5 (Winter 1977), pp. 85-95; Richard Pomfret, The Economic Development of Canada (Toronto: Methuen, 1981), pp. 33-46, O.J. Firestone, Canada's Economic Development, 1867-1953 (London: Boves and Boves, 1957). Also, see Richard Caves and R.H. Holton, The Canadian Economy: Prospect and Retrospect (Cambridge, Massachusetts: Harvard University Press, 1959). The Neo-Marxian version of the staple export theory is not used here. For a brief summary of this version and its applications, see R.F. Neill, "The Neo-Classical-Neo-Marxian Staple Theory and Resource Export Industries in Ontario 1868-1968," a paper presented at the annual meeting of the Canadian Economics Association, May 1978).

growth is a function of the export performance of a small set of dominant products. Exploitation of the export staple provides a base for other related activities that supply intermediate inputs to the staple producing firms and that process the staple product and provides for "residential" activities that serve workers and others engaged in producing, processing and shipping the export staple. As a result of linkages between staple producing and other related firms, spread effects of various types stimulate the growth of a region's economy.

Between 1801-1851, square-timber and deals exported to Great Britain were staple products for Eastern Ontario. The square-timber trade gave rise to several manufacturing industries which were linked to it. Linkages of the square-timber trade with agriculture and transportation were also apparent.

The application of the staple product thesis to regional economic growth assigns a great role to factor migration and initial factor endowments such as natural resources. Factors migrate in response to high returns offered by a staple export. In the Ottawa Valley, labour migration, and, to a limited extent capital migration, did take place from other parts of the world as well as within the Region to exploit the timber resources.

Not all the spread effects flowing from the timber trade stayed in the Region. The accrual of linkage effects to a region from its economic activities or the activities of other regions depends, other things being equal, on its initial endowments such as the prior accumulation of population, financial capital, nature-given resources, productive capacity, entrepreneurial class and political power.¹ Though Eastern Ontario had vast natural

¹ John McCallum, Unequal Beginnings: Agriculture and Economic Development in Quebec and Ontario Until 1870 (Toronto: University of Toronto Press, 1980), p. 116.

resources in the form of forests and natural waterways, it did not enjoy an endowment of such factors as pre-accumulation of financial capital and political power, so some of the spread effects leaked away to Quebec, Montreal and metropolitan centres in Great Britain - the centres which controlled the timber profits. In brief, the timber trade brought an era of qualified prosperity to the Region. Productive capacity and social infrastructure created by the timber trade was later used by the sawn-lumber trade. However, the square-timber trade exhausted most of the white pine forests in the Region. Forest resources were converted into "financial flows", and much of the profit went to other places outside the Region.

In the second period, it was the sawn-lumber trade with America that was the staple product, for some time paralleling the square-timber trade. The sawn-lumber trade involved processing the raw material and was more capital-intensive than the square-timber trade. It attracted an enormous amount of foreign capital and a number of entrepreneurs from the United States. Sawing operations underwent technological advances in the form of saws with broader blades, circular saws and band saws. The sawn-lumber trade provided more incentives to other industries than the square-timber trade as the former had more value added content than the latter because of additional processing required within the Region. Sawmilling was the first industry to benefit from the lumber trade with the U.S. Apart from the sawn-lumber trade, export of several agricultural products to the U.S. also contributed to the growth of the Region and diversification of its economy. By the end of the century Eastern Ontario ceased to be dependent on a single staple product for its exports trade.

To the question whether or not the sawn-lumber trade resulted in self-sustaining growth of the Region, the answer seems to be "no". For

self-sustaining growth either diversification of the economy in the form of industrialization or the rise of other natural export products is necessary. In Eastern Ontario, neither of these things occurred. On the contrary, the growth rate of the manufacturing sector declined at the close of the century. The decline of the sawn-lumber industry was not offset, as the decline of the square-timber trade had been, by the rise of another staple product. Though the pulp and paper industry made its appearance in the 1880's, overlapping the sawn-lumber industry, it did not have any significant impact until the first quarter of the twentieth century. Furthermore, the pulp and paper industry even in the twentieth century did not influence the growth of the Region to the extent the sawn-lumber industry did in the nineteenth century.

It seems that the decline of the sawn-lumber trade led to the stagnation of the economy of Eastern Ontario, as the staple theory would lead us to expect. The crumbling of the export base is likely, given time, to lead to emigration of labour and capital, the decline of the residentiary industries, and the eventual reversal of the Region's growth rate.¹ Though some of the slack was taken up by the diversification of agriculture, this was not enough to reverse the trend to a declining growth rate.

There is no single staple export product in the Region in the present century. It seems that the present slow growth of the Region may be due to the lack of any major export product.

Further, if Eastern Ontario does not possess any staple product of its own, to what extent does it benefit from the spread effects of staple products of other regions of Ontario and of Canada? The growth effects of

¹A.D. Scott, op. cit., p. 81.

export products, such as autos, nickel, wheat, etc., stay in the core regions of Ontario or they flow to the U.S.A. in the case of autos. Even the spread effects of manufacturing in the Region do not all stay within it. They spill over to other core regions of Ontario and abroad.

The Metropolitan-hinterland growth concept¹ also comes close to explaining the growth process of the Region in the first period. According to this framework, it is the interplay between a metropolitan centre and its natural resource-rich frontier that causes a region to grow. The development of the freshly opened frontier into a firmly rooted hinterland depends on the abundance of nature-given resources and the growth of the city or metropolis that ultimately disposes of the resource harvest, makes investment in capital supplies, manpower, enterprise, and provides the necessary technology to produce the desired goods.

In Eastern Ontario, two types of frontier appeared: the forest frontier and the frontier of agricultural settlement. The net result of these two types of frontier was that the Region grew rapidly while the frontiers were expanding within it and its growth rate slowed down when these frontiers moved beyond it in the second half of the nineteenth century. However, the frontier of the timber trade was not accompanied by much permanent productive capacity as was the case in the agricultural frontier. One thing was common to both these frontiers. They both required an enormous amount of labour. The agricultural frontier gave rise to flour milling, brewing and distilling and the manufacture of agricultural implements. Also,

¹ J.M.S. Careless, "Metropolis and Region: The Interplay Between City and Region in Canadian History Before 1914," Urban History Review, No. 3-78 (February, 1979), pp. 99-118.

the agricultural frontier led to permanent settlement while the forest frontier did not, except insofar as it left cleared land suitable for agriculture.

The urban centres of the Region such as Kingston and Ottawa did provide markets for agriculture but they ~~did not~~ provide the main markets for the forest industries. The demand for forest products came mainly from foreign metropolises such as London, Liverpool and later metropolises in the U.S.A. In some cases, the urban centres of the Region acted as warehouses and forwarding or "link" points where imported goods were kept and shipped to the timber frontier as in the case of Ottawa. At the close of the eighteenth century and the beginning of the nineteenth century, Kingston also served as a warehousing centre for shipments to Montreal.

In the second period, the advance of the forest frontier and saw-milling in Eastern Ontario were tied to demand from an expanding American metropolitan system. Again there was no regional metropolitan centre that generated a major demand for the forest resources and influenced the growth of the Region. However, population expansion of national metropolises such as Toronto and Montreal may have created a demand for forestry products of the Region. In the third period, there has been no new frontier in the Region, nor has there been any foreign dominant metropolis to stimulate the growth of the Region. Ottawa, the largest metropolitan area of the Region, has failed to exert any significant economic impact on the Ottawa Valley let alone on the Region as a whole. Toronto influences the activities of a large number of counties in the western part of the Region and has probably weakened the growth of Kingston or Belleville as major manufacturing centres. Urban centres in the eastern part of the Region look toward Montreal for sophisticated goods and services.

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Another theoretical approach that seems relevant to the growth process of Eastern Ontario is that of cumulative circular causation.¹ According to this concept, economic development does not appear everywhere and once it has appeared in one centre, powerful forces are set in motion that make for spatial concentration of economic activity at the initial starting point. Development occurring in these initial growing points will induce or retard development in their hinterland depending on the relative strength of positive growth effects ("trickling-down" effects, as Hirschman calls them, or "spread" effects, as Myrdal labels them) and negative growth effects ("polarization" effects, according to Hirschman and "backwash" effects according to Myrdal).

The net effects of these two contrary forces, according to Myrdal, will be negative over the long run. The cumulative growth process of a growth point will have ill effects on its hinterland by draining away from it highly-skilled workers and capital. Hirschman, on the contrary, is optimistic and suggests that "trickling-down" effects will overcome the "polarization" effects in the long run and the process of the decline of the hinterland will be reversed.

In the first period this theory does not seem to apply in its totality to the economic development of Eastern Ontario, though some aspects of it seem to apply. This theory assumes that backwash effects would dominate the spread effects in the initial stages of development. In the case of Eastern Ontario, no doubt during the lumber trade era, the Region experienced

¹G. Myrdal, Economic Theory and Underdeveloped Regions (New York: Harper and Row, Publishers, 1957); and A.O. Hirschman, The Strategy of Economic Development (New Haven and London: Yale University Press, 1958).

a rapid growth but a significant proportion of spread effects leaked out to the British metropolises and merchants. It is true that the skilled labour and capital from Eastern Ontario did not flow to the metropolises in Great Britain; but the fine white pine forests which could be considered as natural or social capital, were drained away by the importers in Great Britain.

The cumulative circular causation framework seems more relevant in the second and third periods. Since the disappearance of the square-timber and the sawn-lumber trades, the Region has been experiencing slower growth rates. The forces that gathered momentum in the second half of the nineteenth century (i.e., concentration of manufacturing establishments and population in Central and Western Ontario) to act against Eastern Ontario, are still in operation. Despite the fact that Eastern Ontario enjoys certain advantages over other regions in the form of lower wages, highly skilled labour, and excellent R&D activities, it is still relatively less industrialized than other regions.

Growth pole theory¹ does not explain the growth of Eastern Ontario.

The basic thinking behind growth pole theory is the same as that of cumulative

¹For a full review of the growth pole theory, see T. Hermansen, "Development Poles and Development Centres in National and Regional Development, Elements of a Theoretical Framework", in A. Kuklinski (editor), Growth Poles and Growth Centres in Regional Planning (The Hague, Mouton: 1972), pp. 1-67. This book of readings contains several other articles and references on growth pole theory. N. Hansen (editor), Growth Centres in Regional Economic Development (New York: The Free Press, 1969); J.M. Moseley, Growth Centres in Spatial Planning (New York: Pergamon Press, 1975); François Perroux, "Note on the Concept of Growth Poles", in David L. McKee *et al.* (eds.), Regional Economics: Theory and Practice (New York: Free Press, 1970), translated by Linda Gates and Marie McDermott from the original French "Notion de Croissance", Économie Appliquée, Vol. I & II (1955), pp. 307-320; J.R. Lasuen, "On Growth Poles," Urban Studies, Vol. 6 (1969), pp. 163-188; J.B. Parr, "Growth Poles, Regional Development and Central Place Theory," Papers of Regional Science Association, Vol. 31 (1973), pp. 173-212.

causation theory, i.e., growth is unevenly distributed. It appears in certain "leading sectors" or "development poles"¹ or "growth poles". These leading sectors are a set of "propulsive" industries that are "innovative" and generate spread effects. These spread effects are transmitted to other sectors or peripheral areas or the hinterland through inter-industry linkages, thereby increasing their growth levels. From this there follows a simple prescription of instituting or locating a system of growth poles, if there is none already, for the development of a retarded region in the expectation that these poles will generate and transmit growth impulses to the other areas and sectors of the Region. Thus, this theory includes both sectoral, spatial and intertemporal aspects of economic development.

Though the timber industry in the first period acted as a leading industry of Eastern Ontario, it did not exert such a strong effect on other industries that it could be called a development pole. The value-added content of the timber trade was small and, thus, the timber industry did not buy a great deal from nor sell to other industries in the Region. Whatever effects it had on other industries, can be easily studied within the framework of the staple product theory. Other sectors such as manufacturing lacked stimulating effects and thus cannot be considered as candidates for development poles. Agriculture in the St. Lawrence sub-Region that produced an exportable surplus at the close of the nineteenth century also did not act as a development pole for the Region. Further, growth pole theory

¹The term "development pole" is used to denote the concentration process in the sectoral sense and "growth pole" is used to denote the concentration of economic activities in the "spatial" sense. For alternative definitions of these concepts, see Benjamin Higgins, Development Poles: Do They Exist?, Research Paper No. 25, Faculty of Social Sciences, University of Ottawa, 1974.

assumes a concentration of interdependent firms or industries in various sectors or in a geographic area, but the activities of the timber industry were spread all over the Region and Quebec.

Finally, growth pole theory in a geographic or spatial sense requires the existence of an urban centre with concentration of interrelated and interdependent fast growing industrial firms. In Eastern Ontario before 1851, there was no such centre. The urban centres that existed were not growth poles; rather they were either points of transshipment (Kingston, Prescott), "link" places, or administrative centres (Kingston), or garrison towns (Kingston) or timber towns (Trenton, Pembroke, Belleville and Ottawa). They provided their hinterlands with services of various orders. It was not these urban centres that were propulsive; rather it was their hinterlands specializing in timber and agricultural operations which were propulsive. The urban centres that initiated the activities in the hinterland were located in Great Britain and the U.S.A. and not in Eastern Ontario. These foreign centres may be regarded as growth poles for the Region, especially in the first period.

Even in the second and third periods, the growth pole framework did not apply to Eastern Ontario. The Region does not possess any urban centre sufficiently dynamic, innovative and capable of generating and transmitting propulsive effects to other parts of the Region, nor, as has been shown, do the various urban centres interact in a mutually stimulating way. To test further whether the present development of the Region is explained by growth pole theory, two methods of empirical testing¹ were used, viz., the

¹Analysis not reported in this study.

method of lagged correlation as developed by King and others¹ and the technique of "mixed auto regressive-moving averages."² Using quarterly series of composite employment indexes of 22 urban centres in Canada, the regression and correlation results indicate that the Region does not possess any development or growth pole. Even Ottawa, the largest urban centre of the Region, is too weak in terms of inter-urban linkages to be called a true growth pole of the Region. It seems that no single theory of development can explain the past growth or lack of growth of the Region over all the three periods.

The dominant but not propulsive force in the development of the Region at the present time is the government sector. Any theoretical framework that does not take into account explicitly the role of government cannot possibly explain the development of the Region. So far, no theory relating to the role of government in the development process of a region has been developed. Such a theory is necessary before we can adequately explain the growth of Eastern Ontario. No attempt, however, has been made here to develop such a theoretical framework. This task is left for future research. Another service industry, tourism and recreation holds promise for the Region. Being labour intensive and relatively less "leakage" prone than the majority of other industries, tourism and recreation activities can go a long way in contributing to a development strategy of the Region, based on local resources.

¹L.J. King, E. Casetti, and D. Jeffrey, "Economic Impulses in Regional Systems of Cities: A Study of Spatial Interaction," Regional Studies, Vol. 3 (1969), pp. 13-218.

²L.J. King, "Conceptual Limitations and Data Problems in Fashioning Growth Pole Strategies: The Case of Ontario, Canada," Geoforum 17/74, pp. 61-67.

APPENDIX

Manufacturing Profile of Major Urban
Centres, Eastern Ontario.

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TABLE A-1

Manufacturing Industries, Ottawa, 1851, 1861
(Measured in Terms of Employment)

	1851		1861	
	No. of Firms	No. of Employees	No. of Firms	No. of Employees
Flout and Cristallins	3	12	2	-
Sawmills	4	-	12	765
Tanneries	5	-	1	3
Carriage Factories	5	-	-	-
Foundries	2	-	1	14
Breweries	1	-	3	14
Cabinetware	2	-	4	-
Axe and Edge	-	-	3	-
Agriculture Equipment	-	-	2	-
Other Industries ^a	8	-	8	-

- Indicates that figures were not available.

^a Other industries for 1851 include potasheries, boot and shoe factories, paper mills, tin ware, distilleries, soap factories and woolen mills.

For 1861, other industries include tanning mills, brick yards cooperage, brass works, hat factories, woolen mills, soap factories.

Sources: (1) Canada, Board of Registration and Statistics, Census of the Canada 1851, Vol. 2 (Quebec: Lovell, 1855), pp. 260-269.

(2) Census of the Canada 1861, Vol. 2 (Quebec: Toole and Lamouroux, 1864), pp. 236-253.

TABLE A-2

Manufacturing Industries, Ottawa 1871

	No. of Firms	No. of Workers	Value Added (\$'000)
All Manufacturing	198	3064	1616
Bakeries	17	87	65
Dressmaking	21	109	29
Tailoring	24	431	124
Sawmills	7	1202	486
Printing and Publishing	4	208	220
Carriage Makers	11	76	52
Woolen Mills	2	64	34
Sash and Door Factories	3	92	46
Foundry and Machine Works	4	84	75
Other Manufacturing ^a	105	711	485

^a Other industries include cordias syrup, meat curing, cigar making, fish curing, furreries and hatters, stoves and cooperage, graphic galleries, carving, gliding coffins and caskets, picture framing, tin and sheet making, carpenters, boat builders, shipyards, broom making, stone cutting, soap and candle making, gun smithing, wig making, carding and fulling, wood turning, oil refinery, patent medicine, starch and oil cloth, miscellaneous wares, electricity, gas works, mattress making, engraving and lithographing, breweries, harness and saddling, etc.

Sources: Canada, Department of Agriculture, Census of Canada, 1871, Vol. 2 (Ottawa: 1873), pp. 290-433.

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TABLE A-3

Manufacturing Industries, Ottawa 1881

	No. of Firms	No. of Workers	Value Added (\$'000)
All Industries	270	3945	1746
Bakeries	21	82	58
Boots and Shoes	27	132	67
Cabinet Furniture	11	83	49
Carriage Making	18	91	60
Dressmaking	34	320	103
Saddle and Harness Making	8	74	40
Sewalls	5	1695	517
Tailor and Clothing	25	544	163
Printing Offices	8	375	199
Other Manufacturing *	113	749	490

* Includes carpentry, cooperage, tin and sheet making, broom and brush making, furniture, meat curing, photographic galleries, ship construction, stone and marble cutting, dyeing, scouring, miscellaneous ware, soap and candle making, wood turning establishments, aerated water making, carving, engraving and lithography, gas works, bootery, straw works, wig making and glove and mitten making.

Source: Canada, Department of Agriculture, Census of Canada 1881, Vol. 3 (Ottawa: 1883), pp. 326-496.

TABLE A-4

Manufacturing Industries, Ottawa 1891

	No. of Establishments	No. of Employees	Value Added (\$'000)
All Manufacturing	509	6294	3188
Bookbinding	6	164	53
Carriage Making	21	129	82
Dressmaking	102	450	161
Foundries and Machine Works	9	131	69
Painters and Glaziers	10	165	149
Printing and Publishing	3	202	67
Sash Door and Blind Factories	5	141	79
Sewalls	5	2676	814
Tailors and Clothiers	50	455	242
Other Manufacturing *	298	1781	1472

* Includes aerated water, alter linen, artificial flowers, boat building, breweries, carpentry, carpet making, chemical establishments, cider making, coffins and caskets, confectionary, cooperage, dentistry, engine building, engraving, furries and hatters, gunsmithing, knitting, marble cutting and stone cutting, photographic galleries, planing and moulding mills, portrait painting, shirt collar and tie making, soap and candle making, spring bed factories, tanneries, tin and sheet iron, tinsmithing, box and valise making, watchmaking and jewellers, weavers, wood turning, wine making, wire works, etc.

Source: Canada, Department of Agriculture and Statistics, Census of Canada, 1891, Vol. 3 (Ottawa: 1894), pp. 1-379.

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TABLE A-5

Manufacturing Industries, Ottawa 1901

	No. of Establishments*	No. of Employees	Value Added (\$'000)
All Industries	205	7123	3784
Bread, Biscuits and Confectionary	19	208	185
Carriage and Wagon	5	156	78
Clothing (Men's)	34	814	318
Clothing (Women's)	30	379	96
Foundry and Machine Shop Products	13	356	267
Harness and Saddlery	3	143	68
Lumber Products	8	247	234
Printing and Bookbinding	6	307	189
Printing and Publishing	13	730	565
All Other Industries *	74	3783	1784

*Includes only those establishments that employed five workers or more.

*Includes artificial limbs and trusses, bicycles, bicycle repairs, black-smithing, boats and canoes, boots and shoes, boxes and bags, paper, carboys of calicums, car repairs, coffee and spices, dyeing, cleaning and scouring, electric light and power, flour and distillery products, fringes, cords and tassels, gas, lighting and heating, glass, stained, cut and ornamental, interior decorations, liquors, malt, lock and gunsmithing, log products, monuments and tombstones, musical instruments, patent medicines, refrigerators, saws, scales, signs, stonemasonry, washing machines and wringers, window blinds and shades, wire, wire fencing, woodworking and turning, woollen goods.

Sources: Canada, Department of Agriculture, Census of Canada 1901, Vol. 3 (Ottawa: Printer to King's Most Excellent Majesty, 1905), pp. 200-201.

TABLE A-6

Employment by Industries, Ottawa, 1931, 1951, 1971

	1931	1951	1971
All Industries	51466	87611	141,510
Agriculture	316	1201	310
Forestry, Fishing and Trapping	143	89	55
Mining, Quarrying Oil and Salt Wells	100	66	165
Manufacturing	5357	9690	8385
Food and Beverages	606	1299	1115
Vegetable Products	282	263	210
Animal Products	180	127	75
Textile Products	-	360	185
Clothing	-	-	-
Wood, Pulp and Paper Products; Printing, Publishing, etc.	3424	4334	3350
Pulp, Paper and Paper Products	733	1267	675
Metals, Metal Fabrication and Machinery Industry	-	-	-
Iron and its products	1046	1200	930
Transportation and Construction Equipment	182	550	845
Non-ferrous Metal	-	287	-
Electrical Apparatus Products	-	199	945
Non-Metal Mineral Products	317	260	310
Chemical and Allied Products	166	240	240
Miscellaneous	170	385	985
Other Industries	-	-	160
Electric Light and Power	433	740	740
Construction	3890	4772	6475
Transportation and Communication (not including Postal Services)	4260	5204	7760
Trade	7981	12329	16640
Finance Insurance	2253	4149	6580
Services	24493	47792	92380
Government	11779	33491	55000
Unspecified	1592	910	1380

Sources: (1) Canada, Dominion Bureau of Statistics, Census of Canada, Industries and Occupations, 1931, Vol. VII (Ottawa: Queen's Printer, 1936), pp. 747-751.

- (2) Census of Canada, 1951, Vol. IV (Ottawa: King's Most Excellent Majesty, 1953), pp. 17-41, 17-49.
- (3) Canada, Statistics Canada, 1971 Census of Canada, Industries, Vol. III, Cat. No. 94-744 (Ottawa: Information Canada, 1973), pp. 9-43 to 9-51.

TABLE A-7

	1851		1861	
	No. of Establishments	No. of Workers	No. of Establishments	No. of Workers
Crismills	2	3	1	10
Sawmills	7	33	1	-
Agricultural Equipment	-	-	4	-
Woolen	-	-	2	30
Distilleries	1	-	2	-
Breweries	1	30	6	16
Tanneries	1	25	1	6
Foundries	2	32	3	145
Shipyard	1	-	2	-
Pot and Pearl	-	-	-	-
Asheries	2	-	3	-
Soap and Candles	-	-	5	-
Axe and Edge	-	-	1	-
Carriage and Wagons	-	-	3	-
Other Industries*	19	-	8	-

*Other industries include cabinet ware, sash door and blind factories, glue factories, sewing machines, rope factories, etc.

Sources: Canada, Board of Registration and Statistics, Census of the
Canada, 1851, OP. cit., pp. 260-269.

TABLE A-8

Manufacturing Industries of Kingston, 1871, 1881

Name of Industry	1871		Value Added (\$'000)	1881		Value Added (\$'000)
	No. of Firms	No. of Workers		No. of Firms	No. of Workers	
All Industries	156	1279	685	170	1370	715
Bakeries	14	47	25	12	59	39
Planos	3	78	37	3	99	-
Boot and Shoe Makers	16	88	26	18	84	47
Dressmaking	16	85	14	17	114	18
Tailoring	16	147	54	18	199	77
Printing, Publishing and Book Binding	5	53	19	7	67	34
Tin and Sheet Metal	6	50	24	8	34	21
Shipyards	3	76	29	1	50	7
Foundries	4	138	73	3	114	53
Transport Equipment (Locomotives)	1	173	105	1	153	49
Other Industries*	72	344	279	82	397	275

*Other industries include flour mills, leather products, sawmills, cabinet and furniture, carriage making, textiles, wood products, chemical and mineral products, rope making.

Sources: (1) Canada, Department of Agriculture, Census of Canada, 1871, Vol. 3, OP. cit., pp. 290-433.
(2) Census of Canada, 1881, Vol. 3, OP. cit., pp. 326-496.

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TABLE A-9*

Manufacturing Industries of Kingston, 1891

	No. of Establishments*	No. of Employees	Value Added (\$'000)
<u>All Manufacturing</u>	331	2387	1518
Dressmaking	143	348	102
Tailoring	27	260	96
Stoves and Cooperage	2	71	66
Tin and Sheet Metal Making	8	78	33
Shipyards	1	61	11
Cotton Textiles	1	210	150
Hosiery	2	162	93
Foundries	2	91	42
Transport Equipment (Locomotives)	1	301	146
Planos	5	73	171
Other Industries**	139	732	588

* Included only those establishments that employed five workers or more.

** Other industries include bakeries, breweries, flour mills, boots and shoes, rope making, printing, publishing, sawmills, cabinet and furniture, carriage making, woolen textiles, electricity and gas, planing and moulding mills, etc.

Source: Canada, Department of Agriculture and Statistics, Census of Canada, 1891, Vol. 3, OP. cit., pp. 1-361.

TABLE A-10

Manufacturing Industry, Kingston 1901

	No. of Establish- ments	No. of Workers	Wages and Salaries	Cost of Materials	Value of Output
Clothing (Men's)	6	112	44034	53530	118710
Clothing (Women's)	3	69	17697	20500	54900
Hat, Caps and Fur	4	41	14628	17750	42250
Plumbing and Tin Sheeting	5	117	53880	64810	159070
All Other Industries*	24	1155	397390	892376	1670243
All Manufacturers	42	1394	527690	1048966	2045173

* Includes boilers and engines, bread, biscuits and confectionery, brooms and brushes, carriages and wagons, cottons, flouring and gristmill products, furniture and upholstered goods, gas, lighting and heating, hosiery and knit goods, leather, tanned, carried and finished, liquors, malt, lumber products, malt, rice, cut, musical instruments, patent medicines, ships and ship repairs, tobacco, cigars and cigarettes.

Source: Canada, Department of Agriculture, Census of Canada, 1901, Vol. 3, OP. cit., pp. 190-191.

TABLE A-11

Manufacturing Industries, Kingston, 1931, 1951

	<u>1931</u>	<u>1951</u>
	<u>Employment</u>	<u>Employment</u>
<u>All Industries</u>	8975	14691
Agriculture	38	19
Forestry, Fishing, and Trapping	2	1
Mining, Quarring, Oil and Salt Wells	40	12
Manufacturing	1204	39028
Food and Beverages		211
Vegetable Products	194	-
Animal Products	168	-
Textile Products	24	904
Leather	-	132
Wood, Pulp, and Paper		
Products, Printing, Publishing, Engraving, etc.	194	256
Iron and its Products	497	99
Transportation Equipment		607
Non-ferrous Metal Products	36	1388
Electric Apparatus and Supplies		64
Non-Metallic Mineral Products	115	165
Chemical and Allied Products	28	45
Misc. Products	58	55
Electric Light and Power	51	130
Construction	788	939
Transportation and Communication (not including Postal Service)	986	722
Trade	1549	2377
Finance	219	484
Services	3667	5922
Government (excluding defence and education, health)	978	2082
Unspecified	280	150

Sources: Canada, Dominion Bureau of Statistics, Census of Canada, Occupation and Industries for 1931 and 1951, Vol. VII and Vol. 4 respectively. For 1931, pp. 266-277; and for 1951, Table 17, pp. 17-26 to 17-29.

DEVELOPMENT BY INDUSTRY AND SEX, MAJOR URBAN CENTRES,
EASTERN ONTARIO PLANNING REGION, 1971

N.B. Due to Random Rounding Figures may not equal totals or 100%

TABLE A-13

Manufacturing Industries, Brockville, 1851

	No. of Establishments	No. of Employees
Cristalline	1	6
Seawalls	3	13
Carding and Fulling	1	1
Tanneries	5	13
Foundries	1	60
Other Manufacturing*	7	

*Includes oat mills, shingle making, asheries, rail factory, marble works.

Sources: Canada, Board of Registration and Statistics, Census of the
Canada, 1851, Vol. 2 (Quebec: Lovell, 1853), pp. 260-269.

TABLE A-14

Manufacturing Industries, Brockville, 1871

	No. of Establishments	No. of Employees	Value Added (\$'000)
All Manufacturing Industries	176	887	400
Agricultural Equipment	4	33	23
Bakeries	8	25	18
Blacksmithing	20	34	15
Boots and Shoes	19	50	19
Machine Making	3	195	102
Tanneries	6	30	33
Tailors and Clothiers	7	96	32
Putties	3	33	19
Carpenters	7	42	29
Dressmaking	11	40	11
All Other Manufacturing	88	309	159

Sources: Canada, Department of Agriculture, Census of Canada, 1871,
Vol. 2 (Ottawa: 1873), pp. 290-433.

TABLE A-15

Manufacturing Industries, Brockville 1881, 1891

	1881		1891	
	No. of Establishments	No. of Employees	No. of Establishments	No. of Employees
All Manufacturing Industries	147	958	542	230
Agricultural Equipment	2	113	88	4
Bakeries	3	33	27	7
Blacksmithing	22	44	18	35
Carriage Making	13	34	19	-
Foundries and Machine Making	3	237	146	3
Tailors and Clothiers	7	100	45	14
Edge Tools	-	-	-	1
Cheese Factories	13	26	12	18
Glove & Hicc Mfg.	1	43	15	-
Printing Offices	3	29	14	3
Surgical Appliances	1	33	25	-
Other Manufacturing*	79	266	133	145
				589
				520

*Includes boots and shoes, wool cloth making, breweries, flour and gristmills, saw, door and blind factories, dyeing works, etc.

Sources: (1) Canada, Department of Agriculture, Census of Canada, 1881, pp. 416-496.

(2) Census of Canada, 1891, pp. 326-496.

TABLE A-16

Manufacturing in Brockville, 1901

	No. of Establishments*	Employees	Wages and Salaries		Cost of Materials		Value of Output	
All Industries	48	1205	461755	1003562	1565596	877014		
Butter and Cheese	23	47	10007	267785	296071	30286		
Tobacco, Cigars and Cigarettes	3	29	9355	3338	20020	16182		
All Other Industries**	22	1129	442393	816959	1645505	830546		

*Included only those establishments that employed five workers or more.
**Includes areated and mineral water (1), boiler and engine (1), bread, biscuits and confectionery (1), carriages and wagons (2), clothing (men's) (2), clothing (women's) (1), flour and gristmills (1), foundry and machine shop products (1), gloves and mittens (2), hats and caps (1), leather tanned (2), carried and finished (1), liquors, malt (2), lumber products (2), plumbing and tin smithing (2), printing and publishing (2), refrigerators (1).

R.B. Due to changes in reporting system, the 1901 census figures are not comparable with earlier figures. The 1901 census reports only those firms hiring more than 5 workers.

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TABLE A-17

Employment by Industry, Brockville, 1951

	<u>No. of Employees</u>
<u>All Industries</u>	5140
Agriculture	20
Forestry and Logging	2
Mining, Quarrying and Oil Wells	1
Manufacturing	1866
Food and Beverages	152
Clothing (textiles and fur)	462
Wood Products	17
Paper Products, Printing, Publishing and Allied Industries	63
Iron and Steel Products	203
Transportation and Equipment	94
Electrical Apparatus and Supplies	737
Other Manufacturing	138
Electrical Gas and Water	58
Construction	208
Transportation; Communication	552
Trade	815
Finance, Insurance and Real Estate Service	150
Government	1417
Unspecified	267
	51

Sources: Canada, Dominion Bureau of Statistics, Census of Canada, 1951, Vol. IV (Ottawa: Printer to King's Most Excellent Majesty, 1953), pp. 17-41 to 17-49.

TABLE A-18

Manufacturing Industries, Brockville, 1971

	<u>No. of Employees</u>
Food Products	170
Distilleries and Soft Drinks	31
Metal Industries	170
Electrical Industries	3264
Non-Metallic Industries	108
Plastics	12
Chemical Industries	283
Other Industries	7
Total	4045

Sources: Ontario, Ministry of Industry and Tourism, Industrial Survey, 1974, pp. c1c.

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TABLE A-19

Manufacturing Establishments in Cornwall, 1871, 1881

	1871		1881	
	No. of Establishments	No. of Employees	No. of Establishments	No. of Employees
		Value Added (\$'000)		Value Added (\$'000)
All Manufacturing	66	368	228	68
Agricultural Equipment	-	-	-	-
Blacksmithing	12	19	8	10
Boots and Shoes	9	24	18	8
Carriage Making	3	19	7	2
Flour and Gristmills	5	22	33	3
Sawmills	5	18	10	5
Wool Cloth Making	2	155	94	5
Tailors and Clothiers	2	5	15	4
Tin, Sheet and Iron Making	3	5	4	5
Other Manufacturing Industries*	25	101	29	23

*Includes cabinet and furniture, lime, saddle and harness making, tanneries, cheese factories and potteries.

Sources: (2) Canada, Department of Agriculture, Census of Canada, 1871, Vol. 3, GP. cfc. pp. 290-433.

(2) ———, Census of Canada, 1881, Vol. 3, GP. cfc. pp. 326-496.

TABLE A-20

Manufacturing Establishments in Cornwall, 1891

	No. of Establishments	No. of Workers	Value Added (\$'000)
All Manufacturing Establishments	505	2561	1467
Blacksmithing	68	68	48
Boots and Shoes	42	45	17
Cheese Manufacturing	31	47	38
Cotton Mills	2	1191	655
Dressmaking	62	114	42
Sawmills	17	131	51
Sash, Door and Blind Factories	2	46	38
Tailors and Clothiers	25	108	58
Woolen Mills	15	262	177
Other Manufacturing*	242	549	343

*Includes aerated water, brick and tile makers, cabinet and furniture, carpenters, carriage making, flour and gristmills, foundries, printing and publishing, tin smithing, tanneries, etc.

Sources: Canada, Department of Agriculture and Statistics, Census of Canada, Vol. 3, GP. cfc., pp. 1-378.

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TABLE A-21

Manufacturing Establishments in Cornwall and Stormont 1901

	No. of Establishments*	No. of Workers	Value Added (\$'000)
<u>All Manufacturing Establishments</u>	104	602	1312
Bones, Wooden	3	39	9
Bread, Biscuits and Confectionery	4	32	14
Brick, Tile and Pottery	3	27	26
Butter and Cheese	48	95	62
Clothing (Men's)	6	59	22
Clothing (Women's)	4	29	-
Flour and Gristmills	3	19	28
Log Products	14	269	84
Plumbing and Tinsmithing	3	21	13
All Other Manufacturers**	16	1461	1054

*Included only those establishments that employed five workers or more.

**Includes carriages and wagons (2), clothing (men's)(2), flour and
grist mill products (1), furniture and upholstered goods (1), log products (2),
lumber products (1), wire fencing (1), woolen goods (1).

Sources: Canada, Department of Agriculture, Vol. 3, Census of Canada, 1901
(Ottawa: 1905), pp. 178-179.

TABLE A-22

Employment by Industry
Cornwall, 1951

	No. of Employees
<u>All Industries</u>	6808
Agriculture	26
Forestry	21
Mining, Quarrying and Oil Wells	3210
Manufacturing	115
Food and Beverage	1758
Leather Products	136
Clothing (textile and fur)	96
Wood Products	872
Paper Products, Printing, Publishing and Allied Industries	730
Pulp and Paper	44
Iron and Steel Products	60
Transportation and Equipment	83
Chemical Products	24
Other Manufacturing	45
Electricity, Gas and Water	337
Construction	1120
Transportation, Communication and Storage	441
Trade	136
Finance, Insurance and Real Estate	1491
Services	275
Government	51
Not Specified	51

Sources: Canada, Dominion Bureau of Statistics, Census of Canada, 1951
(Ottawa: Printer to King's Most Excellent Majesty, 1953),
pp. 17-41 to 17-49.

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TABLE A-23

Manufacturing Industries, Cornwall* 1971

	No. of Establishments	Total Employees	Value Added (\$'000)
Food and Beverage Industries	9	160	2245
Clothing Industries	3	304	1758
Printing and Publishing and Allied Industries	7	104	2094
Metal Fabricating Industries	3	73	556
Non-Ferrous Mineral Product Industries	8	120	1238
Chemical and Chemical Products Industries	11	912	20560
Miscellaneous Manufacturing Industries	6	535	6156
Other Major Groups	17	3190	41929
TOTAL ALL INDUSTRIES	64	5398	76536

*Cornwall City Only

Sources: Canada, Statistics Canada, Manufacturing Industries of Canada,
Geographic Distribution 1971, Cat. No. 31-209 Annual (Ottawa: 1975),
pp. 126-127.

TABLE A-24

Manufacturing Establishments, Belleville 1851

	No. of Establishments	Employment
Cristallite	3	12
Sawmills	3	31
Woollen Mills	2	4
Distilleries	1	-
Tanneries	1	10
Breweries	2	8
Other Manufacturing*	6	-

*Hastings County also returns 1 lath mill, 1 shingle mill,
2 carriages, 1 saw, 1 paper and 1 lath factory. It is not clear how many
of these were located in Belleville.

Sources: Canada, Board of Registration and Statistics, Census of the
Canadas, 1851, Vol. 2 (Quebec: Lovell, 1855), pp. 260-269.

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TABLE A-25

Employment by Industry, Belleville, 1951

	No. of Employees
<u>All Industries</u>	8404
Agriculture	26
Forestry and Logging	2
Fishing and Trapping	3
Mining, Quarrying and Oil Wells	3
Manufacturing	2497
Food and Beverages	324
Tobacco and Tobacco Products	3
Rubber Products	45
Leather Products	42
Textile Products (except clothing)	139
Clothing (textile and fur)	115
Wood Products	79
Paper Products, Printing, Publishing and Allied Industries	684
Iron and Steel Products	162
Transportation Equipment	49
Non-Ferrous Metal Products	469
Electrical Apparatus and Supplies	53
Non-Metallic Mineral Products	191
Chemical Products	118
Misc. Manufacturing Industries	438
Electricity, Gas, and Water Construction	1186
Transportation, Communication and Storage	1696
Trade	266
Finance, Insurance and Real Estate	2411
Service	651
Government	56
Not Specified	

Source: Canada, Dominion Bureau of Statistics, Census of Canada, 1951, GP. cit., pp. 17-1 to 17-10.

TABLE A-26

Manufacturing Industries, Belleville, 1971

	No. of Establishments	No. of Workers	Value Added (\$'000)
<u>All Manufacturing Industries</u>	54	3948	59
Food and Beverages	11	503	13
Printing, Publishing and Allied Industries	5	144	1.5
Metal Fabricating	7	368	5
Miscellaneous Manufacturing Industries	9	446	3.4
Other Manufacturing Industries	22	2487	36

Source: Canada, Statistics Canada, Manufacturing Industries in Canada: Geographic Distribution, Cat. No. 31-209 (Ottawa: Information Canada, 1975), pp. 122-123.

Detail Breakdown of Manufacturing, Belleville

	No. of Employees
Allied Chemicals	63
Optical Lenses	256
Cheese Factory	176
Food Manufacturing	100
Cement Manufacturing	194
Discilleries	345
Metal Casting	179
Building Hardware	226
Pharmaceutical	294
Electronics	955
Metal Hardware Equipment	274
Other Manufacturing	881

Source: Ontario, Ministry of Industry and Tourism, Industrial Survey, 1973, GP. cit.

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