1

National Library
of Canada

Bibliothèque nationale
du Canada

Canadian Theses Service

Service des thèses canadiennes

Ottawa, Canada
K1A 0N4

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, tests publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30.

AGRICULTURE IN A FOREST SETTING:
LANARK COUNTY 1851 - 1871

by

Karl J. Skof, B.A. (Hons.)

Department of Geography

Submitted in partial fulfillment of the
requirements for the degree MASTER of Arts

Carleton University
Ottawa, Ontario
August 1987

(c) Copyright 1987, Karl J. Skof

Permission has been granted to the National Library of Canada to microfilm this thesis and to lend or sell copies of the film.

The author (copyright owner) has reserved other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without his/her written permission.

L'autorisation a été accordée à la Bibliothèque nationale du Canada de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

L'auteur (titulaire du droit d'auteur) se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation écrite.

ISBN 0-315-46240-X

The undersigned recommend to the Faculty of Graduate
Studies and Research acceptance of the thesis

"AGRICULTURE IN A FOREST SETTING:
LANARK COUNTY 1851 - 1871"

submitted by KARL J. SKOF, B.A. (HONS.)
in partial fulfillment of the requirements for
the degree of Master of Arts.

THESIS SUPERVISOR

CHAIRMAN, DEPARTMENT OF GEOGRAPHY

Carleton University
1987

ABSTRACT

While types of agriculture in nineteenth century Ontario were undoubtedly affected by ethnicity and gender, this thesis looks at the distinct types of agriculture that existed in Lanark County of Eastern Ontario between 1851 and 1871. In the midst of an area where lumbering was predominant and was a major market for farm products, the character of the agriculture took on a form that was shaped by the demands of the forest industry. Component analysis reveals the major types of agriculture that were grouped into mixed and specialized farming. The relationship between these groups of farming and land quality showed that certain types of agriculture, which were more established, existed on good soils, while subsistence agriculture was found on the poor soils of the Canadian Shield. The amount of crop and pasture land associated with each type of farming was investigated by regression as surrogates for developed and less developed agriculture. Computer assisted plots were produced to make these various comparisons between the groups of farming and crop land, pasture land, and land quality. The major types of agriculture in Lanark County were also compared to a typology of forest frontier, farmers and settlers as described by A.R.M. Lower.

ACKNOWLEDGEMENTS

The years I have spent at Carleton University as a full-time and part time student have been a very rewarding experience. In the Department of Geography I had the pleasure of meeting the many distinguished individuals who make this department one of the finest in the country. They are an example for graduates to follow in setting their goals. I would particularly like to thank Dr. John Clarke, a dedicated member of the department, for being my advisor, educator and friend during my period at Carleton.

I also thank my family for the patience and understanding they showed when I was working on my thesis rather than spending time with them. Finally, I thank my wife, Harber, whose patience, support and especially her typing skills, enabled me to complete this thesis.

TABLE OF CONTENTS

	Page
CERTIFICATE OF EXAMINATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF FIGURES	vi
LIST OF TABLES	ix
CHAPTER I - Introduction	1
CHAPTER II - The Physical Background to Settlement	9
CHAPTER III - Settlement and Types of Settlers	37
CHAPTER IV - The Forest Industry and Farm Participation	51
CHAPTER V - Land Clearing and Crops	69
CHAPTER VI - Data Sampling and Variables	97
CHAPTER VII - Major Types of Agriculture	106
CHAPTER VIII - Crop and Pasture Land	156
CHAPTER IX - Summary and Conclusion	189
APPENDICES	198
BIBLIOGRAPHY	217

LIST OF FIGURES

Figure 1.1	Lanark County in Ontario	5
Figure 2.1	Towns and Townships of Lanark County	12
Figure 2.2	Rivers and Lakes of Lanark County	14
Figure 2.3	Bedrock Geology of Lanark County	17
Figure 2.4	Soil Capability of Lanark County	23
Figure 2.5	Vegetation of Pakenham Township, 1823	31
Figure 3.1	Lanark County Colonization Roads, 1866	41
Figure 4.1	Lanark County Systematic Sample Locations, 1871	58
Figure 4.2	Cubic Feet of Squared Pine for 1871 (Per Farm)	59
Figure 4.3	Pine Logs for 1871 (Per Farm)	61
Figure 4.4	Cubic Feet of Squared Timber for 1871 (Per Farm)	62
Figure 4.5	Timber Logs for 1871 (Per Farm)	63
Figure 5.1	The Percentage of Agricultural Land Per Farm in Lanark County 1841-1871	72
Figure 5.2	Agricultural Land in Acreage Per Farm, Lanark County 1841-1871	73
Figure 5.3	Crop Land Distribution for 1851/52 (Percentage Per Farm)	74
Figure 5.4	Pasture Land Distribution for 1851/52 (Percentage Per Farm)	75
Figure 5.5	Crop Land Distribution for 1871 (Percentage Per Farm)	77
Figure 5.6	Pasture Land Distribution for 1871 (Percentage Per Farm)	79
Figure 5.7	Mean Output of Crops Per Farm	85

	Page
Figure 5.8 Percentage of Farms According to the Type of Crop Grown	88
Figure 7.1 Distribution of Livestock/Mixed Farming Component Scores for 1851/52	112
Figure 7.2 Distribution of Mixed Farming/Lumbering Component Scores for 1851/52	115
Figure 7.3 Distribution of Crop/Grain Farming Component Scores for 1851/52	117
Figure 7.4 Distribution of Cheese Farming Component Scores for 1851/52	119
Figure 7.5 Distribution of Oxen/Cattle Farming Component Scores for 1851/52	121
Figure 7.6 Distribution of Livestock Farming Component Scores for 1871	129
Figure 7.7 Distribution of Mixed Farming, Oat/Spring Wheat Emphasis Component Scores for 1871	132
Figure 7.8 Distribution of Cheese Farming Component Scores for 1871	134
Figure 7.9 Distribution of Cattle Farming Component Scores for 1871	136
Figure 7.10 White Pine Harvest for Lanark County and Vicinity	137
Figure 7.11 Distribution of Forest/Fall Wheat Component Scores for 1871	139
Figure 7.12 Major Agricultural Regions of Lanark County, 1851/52	143
Figure 7.13 Major Agricultural Regions of Lanark County, 1871	144
Figure 7.14 Roads of Lanark County 1850	147
Figure 7.15 Roads of Lanark County 1863	148
Figure 7.16 Roads of Lanark County 1880	150

		Page
Figure 8.1	Distribution of Crop Land Residuals for 1851/52	163
Figure 8.2	Distribution of Pasture Land Residuals for 1851/52	167
Figure 8.3	Distribution of Crop Land Residuals for 1871	176
Figure 8.4	Distribution of Pasture Land Residuals for 1871	179

LIST OF TABLES

		Page
Table 2.1	Soil Capability of Lanark County	22
Table 2.2	A Segment of Pakenham's 1823 Surveyor's Field Notebook	30
Table 4.1	List of Major Lumber Operators	52
Table 4.2	Québec City Timber Stocks (Cubic Feet)	55
Table 5.1	1851/52 Agricultural Means of Crops, Animals, Products and Acreage Per Farm for Lanark County (N=271)	83
Table 5.2	1871 Agricultural Means of Crops, Animals and Products Per Farm for Lanark County (N=385)	84
Table 5.3	York County Mean Output Per Farm for Farm Products and Number of Livestock	89
Table 5.4	1851/52 Crop Yields for Lanark County and the Province of Ontario in Bushels Per Acre (N=271)	91
Table 6.1	Agricultural Variables Obtained From the Canada Census of 1851/52, Lanark County	101
Table 6.2	Agricultural Variables Obtained from the Canada Census of 1871, Lanark County	102
Table 7.1	Principal Components 1851/52 Analysis	108
Table 7.2	1851/52 Principal Components	109
Table 7.3	Principal Components 1871 Analysis	126
Table 7.4	1871 Principal Components	127
Table 8.1	Principal Components 1851/52 and 1871	158

Table 8.2	Principal Components Stepwise Multiple Regression Equation for Crop and Pasture Land for 1851/52	159
Table 8.3	Settlers in Pakenham Township, 1851/52	166
Table 8.4	Settlers in Drummond Township, 1851/52	168
Table 8.5	Principal Components Stepwise Multiple Regression Equation for Crop and Pasture Land for 1871	171
Table 8.6	Settlers in North Elmsley Township, 1871	178
Table 8.7	Settlers in South Sherbrooke and Bathurst Townships, 1871	181

CHAPTER ONE

INTRODUCTION

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This thesis deals with the nature of agriculture in Lanark County, Ontario during the years 1840-1870. Throughout this period, Lanark County is shown to have practised a mixed agriculture commonly found in the eastern region of the province, close to lumbering areas. The common perception of what agriculture was like at this time is that wheat was strongly emphasized. This is primarily because wheat had been the basis of the provincial economy, especially in Southern Ontario, for over half the century.¹ In this report Lanark was more typical of Eastern Ontario than of Southern Ontario, as a whole.

The thesis primarily explores the different types of agriculture found within the broader context of mixed farming. Emphasis is placed on changes in the production of crops, livestock and farm products between 1851 and 1871. In addition, it seeks to examine the hypothesis advanced by a number of historians that, in this part of Ontario, there was not one but several types of farmers. This involves a comparison of classes of farmers identified

through typologies developed in the literature with a statistical identification of farm types for Lanark County.

While agriculture is the central theme of this thesis, it cannot be examined without some discussion of the forest industry. This is because of the importance of the timber trade in the nineteenth century as a market for farm products. For many of the farmers, the forestry industry was more than just a market; it also provided them with winter employment. As will be discussed later, forestry and farming were inextricably intertwined in nineteenth century Lanark County.

1.2 Literature

There is little in the literature of Ontario historical geography or economic history that is germane to the topic of agriculture, although the related theme of settlement has received considerable attention. In general terms, the most significant studies on the history of agriculture in Ontario are those of Jones² and Reaman.³ In addition, McInnis⁴ has written about the changing structure of Canadian agriculture while McCallum⁵ compares agriculture and economics in nineteenth century Ontario and Quebec. Monographs by Burton⁶, McCalla⁷ and Fowke⁸ portray early

Canadian agriculture as depending primarily on wheat as the cornerstone, of Ontario's economic growth before Confederation. The various types of wheat farming employed in early Simcoe County have been studied by Kelly,⁹ who provides an understanding on the diversity of mixed and specialized agriculture of the nineteenth century.

Concentrating primarily on agriculture and settlement patterns of nineteenth century Ontario, a fair number of historical geographers have used a spatial or statistical approach. Brunger¹⁰ used cluster analysis to look at site factors of vegetation and land types as having an influence on the choice of farmland. Trend surface analysis was used by Clarke¹¹ to describe the spread of settlement over a period of time in Southwestern Ontario. In another paper by Taylor, Clarke, and Wightman,¹² census information for Southern Ontario was used to show the changing pattern of population from 1831-91. In their most recent work, Taylor, Clarke and Wightman used polynomial regression to classify the experience of Southern Ontario townships with respect to rates of land acquisition and clearance for the aforementioned years.¹³ In his study of Ontario townships from 1800 to 1850, Gentilcore¹⁴ used correlation analysis on a range of physical and agricultural variables, to demonstrate that initial settlement was indiscriminate of the physical environment, but changed by 1850 when settlers

possessed enough information to choose the most fertile land available.

The intricate relationship that existed between agriculture and lumbering, as was present in Lanark County, is described in books and essays by A.R.M. Lower.¹⁵ In his article on 'Settlement and the Forest Frontier in Eastern Canada',¹⁶ he lists the various types of farmers who settled the forest landscape and participated in the lumber industry. Lower, along with Jones and Kelly, devotes considerable space to describing agriculture in the context of lumbering but does so in general terms.

1.3 Summary

While there is a growing literature on agriculture and the related theme of settlement, it deals with agriculture at a most general level using, as Clarke and McCalla did, such aggregate variables as total land cleared. It does not deal with detailed analysis of land use and it has, until recently, assumed a homogeneity that does not match the physical reality of the province. A noticeable exception is the work of Lloyd Reed. Reed specifically recognized regionalization within nineteenth century Ontario agriculture.¹⁷ The implication of this statement and of his work is that in this Eastern region, wheat was

Lanark County in Ontario

Figure 1.1

Source: After J. Clarke

not King; a suitable descriptive model is not therefore one of a wheat monoculture, but of a diverse agriculture oriented to lumbering. The aim of this thesis is to quantitatively validate this descriptive model for part of Eastern Ontario and, by so doing, learn not only about agriculture in this region, but in the province as a whole.

Lanark County was selected as a case study (Figure 1.1) because of its relatively early agricultural settlement, and its contrasting physical landscape; in addition, it was one of the leading producers of lumber during the nineteenth century.

FOOTNOTES

1. R.L. Jones, History of Agriculture in Ontario, 1613-1880, (Toronto 1946), pp. 239, 243.
2. Ibid, 1946.
3. G.E. Reaman, A History of Agriculture in Ontario, (Toronto 1970).
4. M. McInnis, "The Changing Structure of Canadian Agriculture, 1867-1897," Journal of Economic History, XLII, 1, (1982), pp. 191-9.
5. J. McCallum, Agriculture and Economic Development in Quebec and Ontario Until 1870, (Toronto 1980).
6. F.W. Burton, "Wheat in Canadian History," Journal of Economic and Political Science, 3,2, (1937), pp. 210-17.
7. D. McCalla, "The Wheat Staple and Upper Canadian Development," Canadian Historical Association Report, (1978), pp. 87-96.
8. V.C. Fowke, "An Introduction to Canadian Agricultural History," Canadian Journal of Economic and Political History, 8,1, (1942), pp. 56-68.
9. K. Kelly, "Wheat Farming in Simcoe County in the Mid-Nineteenth Century," Canadian Geographer, 15,2, (1971), pp.95-111;
"Notes on a Type of Mixed Farming in Ontario During the Early Nineteenth Century," Canadian Geographer, 17,3, (1973), pp. 205-219;
"The Impact of Nineteenth Century Agricultural Settlement on the Land," in Perspectives on Landscape and Settlement in Nineteenth Century Ontario, J.D. Wood (ed.), (Toronto 1978), pp. 64-77.
10. A.G. Brunger, "Analysis of Site Factors in Nineteenth Century Ontario Settlement," International Geography, (1973), pp. 400-2.

11. J. Clarke, "Spatial Variations in Population Density: Southwestern Ontario in 1851," International Geography, (1972), pp. 408-11.
12. J. Clarke, H.W. Taylor and W.R. Wightman, "Areal Patterns of Population Change in Southern Ontario, 1851-1891: Core, Frontier and Intervening Space," Ontario Geography, 1,12, (1975), pp. 27-48.
13. H.W. Taylor, J. Clarke and W.R. Wightman, "Contrasting Land Development Rates in Southern Ontario to 1891," in Canadian Papers In Rural History, ed. D.H. Akenson, Vol. V, (1986), pp.50-72.
14. R.L. Gentilcore, "Changes in Settlement in Ontario, 1800-50: A Correlation Analysis of Historical Source Materials," International Geography, (1972), pp. 418-419
15. A.R.M. Lower, "Assault on the Laurentian Barrier," Canadian Historical Review, 10, (1929), pp. 29-30;
 "Settlement and the Forest Frontier in Eastern Canada," in Canadian Frontiers of Settlement, (eds.) W.A. MacKintosh and W. Joerg, (Toronto 1936), pp. 37-56.
 Great Britain's Woodyard: British America and the Timber Trade 1763-1867, (Montreal 1973).
16. Ibid, (1936) p. 44
17. L.G. Reed, "Agricultural Geography: Progress and Prospects," Canadian Geographer, 8, (1964) pp. 51-63.

CHAPTER TWO

THE PHYSICAL BACKGROUND TO SETTLEMENT.

2

CHAPTER TWO

THE PHYSICAL BACKGROUND TO SETTLEMENT

2.1 Purpose

The purpose of this chapter is to acquaint the reader with the landscape of the County and provide a basis for the subsequent discussion of agriculture within a forest frontier. This chapter is not concerned with physical geography per se; only those elements of the physical milieu considered relevant to the theme of settlement and economic development are discussed.

The physical description of soils in this chapter is based upon the Canada Land Inventory (CLI) Soil Classification of Lanark. This was the first completed soil survey of the county; unfortunately, it has a major shortcoming. It does not describe the physical environment as it was at the time of first contact by Europeans, but rather at the date of analysis, which was in 1967.

However, in the broadest sense, the CLI classification is still a useful indicator of agricultural potential in the nineteenth century. Knowledge of Lanark's poor soil

quality provides some understanding of why early settlers had a difficult time becoming successful farmers.

Similarly, the geological and glacial descriptions in this chapter are also present-day accounts, but can be readily applied to the last century since these features have not changed dramatically for millenia.

This thesis, however, deals with the last century and it is important that information written during that period be introduced, since agricultural decisions by settlers at that time were based on the available knowledge of the physical environment. In this chapter, written extracts from nineteenth century literature help set the stage by describing the landscape, agricultural potential and forests of Lanark County.

Included in this chapter is a section on towns and political boundaries which discusses and locates some of the major urban centres of the nineteenth century, the various townships of which the county is composed and the principal lakes and rivers which were extremely important during the lumbering era. The last section of this chapter describes the forests of this Eastern Ontario county, whose products were, for most of the nineteenth century, its major export.

2.2 Towns and Townships

Lanark County is situated in Eastern Ontario. It shares boundaries with Carleton County in the east, Leeds and Grenville Counties in the south, Frontenac County in the west and Renfrew County in the north. A total land area of 2,171 sq. km (728,320 acres) is divided among the fourteen townships of: Montague, North, Elmsley, North Burgess, Beckwith, Drummond, Bathurst, North and South Sherbrooke, Dalhousie, Lanark, Ramsay, Pakenham, Darling and Lavant (Figure 2.1). The population of Lanark in 1851/52 was 27,317¹ and had increased to 33,020 by 1871.²

The largest town during most of the nineteenth century was Perth with a population of 2,375 in 1871.³ It had also been the district and county seat since its founding in 1816. It was to this location that many of the first pioneers came before being dispersed by settlement agents to nearby townships.⁴ Smith's Falls, which is located on the Rideau River in Montague Township, became an important centre after the completion of the Brockville-Ottawa Railway (Figure 2.1) in the mid-nineteenth century. This railway, which extended from Brockville to Arnprior, linked most of the important urban centres of Lanark and was initially built to transport timber by rail to the American markets in the south. Smith's Falls location on this rail-

Towns and Townships of Lanark County

Figure 2.1

Source: H. Beldon, Illustrated
Atlas of Lanark County

way link and the Rideau River would eventually transform it into the major town of Lanark County. Other noteworthy towns and villages of Lanark during the period of 1851-1871 were: Almonte, Carleton Place, and the town of Lanark. Almonte and Carleton Place, with populations of 2,080 and 1,205 respectively in 1871,⁵ were also located on the Brockville-Ottawa railway. Both towns, especially Almonte, were situated in the best agricultural lands of the County.

2.3 Lakes and Rivers

Dissecting the surface of Lanark, and very important to the early lumbering trade as a means of transporting logs, are a series of rivers and tributaries that usually have their source in the Canadian Shield. These generally flow east and then north into the Ottawa River (Figure 2.2). The largest of these rivers, the Rideau, was converted into a canal system that provided transportation and access to markets. Sweeping through the centre of Lanark is the Mississippi River, on whose lower reaches a number of towns and villages are to be found. These include Innisville, Carleton Place, Appleton, Almonte and Pakenham. Being an important lumbering river in the last century, tributary streams such as the Clyde and Indian Rivers (Figure 2.2) would feed, into the Mississippi, logs that were bound for

Rivers and Lakes of Lanark County

Figure 2.2

Source: Canadian Dept. of Agriculture,
Soil Survey of Lanark County, Report No. 40

local sawmills or more remote destinations like Ottawa or Quebec City. Most of Lanark County is drained by the Mississippi, except for that part drained by the Tay River in the south, which flows through Perth and empties into the Rideau River at Port Elmsley. There is also a small region in the north drained by White Lake and the Wabash River, which then empty into the Madawaska and contribute to a third watershed area in the county.

2.4 Geology and Geomorphology

It is important to inspect the underlying geology and geomorphology of the County in order to more fully understand the edaphic basis of farming. The early agriculture of Lanark, as with other areas, was greatly affected by the processes of deposition and erosion that, to a large extent, determine soil quality.

The western two-thirds of the county is composed of Pre-Cambrian rock and is commonly referred to as the Laurentian or Canadian Shield. The remaining one-third, known as the Limestone Plain, is located in the east where Paleozoic bedrock of limestone and sandstone is frequent. This part is flat in comparison to the Shield.⁶

A noticeable feature of the Canadian Shield is its elevation, which rises in the northwest section of the county to a height of about 1000 feet (300 metres) above

sea level.⁷ Another characteristic of the Shield is its rough terrain which is extremely resistant to weathering and has been less vulnerable to glacial erosion than the Paleozoic bedrock.⁸ As much as 35 percent of the Shield is made up of intermittent pockets of sand, silt and clay, while the remaining 65 percent of Lanark is exposed rock (Figure 2.3), that has no agricultural value whatsoever.⁹

The less metamorphosed region of the county is the predominantly limestone and sandstone plain that begins at the Shield and extends east and south into Carleton, Leeds and Grenville Counties. This is an area of glacial deposits where shallow and stoney soils have collected, and on which are found dispersed bogs and small patches of clay.¹⁰ Most of the surface features on the plain are of glacial origin where deposition has resulted in various formations. Lacustrine deposits of clays, silts and sands which were laid down in glacial lakes or slow moving waters can be found on either Precambrian or Paleozoic bedrock.¹¹

2.5 Soils and Agricultural Potential

Lanark County has numerous soil types (Table 2.1) which are frequently grouped together and discussed in terms of their capability. The Canada Land Inventory (CLI) soil classification describes the amalgamated soil groups ac-

Soil Capability of Lanark County

Figure 2.4

Source: Canadian Dept. of Agriculture,
 Soil Survey of Lanark County, Report No. 40.

according to their capability and agricultural potential. The classification which follows is based upon this source and offers insight into what the pioneers would have faced in establishing agriculture. There are seven classes and their distinct characteristics appear in Figure 2.4.

Class 1

These soils are high to moderately high in productivity and can nurture a variety of crops. They have no significant limitations, are generally deep, have a good moisture-holding capacity and are well to imperfectly drained.¹² The soils in this class are found primarily in the eastern portion of Ramsay and Pakenham Townships, skirting the Mississippi River (Figure 2.4).¹³ There are also scattered deposits in Beckwith, Montague, Drummond and Bathurst Townships. Once cleared, these soils can be easily worked.

Class 2

Soils in this class are also deep and possess a good moisture holding capacity but have moderate limitations. These soils are primarily in Drummond Township with additional concentrations in Beckwith and Bathurst. There are also small pockets found in the central and eastern sec-

tions of the county. Like the soils of Class 1, the nineteenth century farmers would have had no difficulty working these soils.

Class 3

This soil class has moderately severe limitations that restrict the range of crops grown. They are fair to moderately high in productivity and have the following limitations: a tendency to erosion, slow permeability, and low fertility. Pioneer farmers could have corrected these faults with manuring. There is one major concentration of these soils in Lanark, known as Rideau Clay and found just north of the town of Pakenham (Figure 2.4). While the early settlers might have had problems with these soils, their limited distribution reduced their impact on agriculture; at any rate, Class 3 soils would have been easier to cope with than those of Class 4.

Class 4

Soils of this class have severe limitations, which restrict the range of crops or the yields of crops. The productivity of the soil is low to medium. The limitations are similar to Class 3 but slightly more severe. These

soils are chiefly scattered throughout Drummond and North Elmsley with occasional deposits in Beckwith and Bathurst townships (Figure 2.4).

Class 5

This soil class has extreme limitations that restrict its use to perennial forage crops. Even under modern management conditions, cultivated field crops are not recommended since crop failures would be frequent. If cropping is difficult in contemporary times, under conditions of nineteenth century agriculture it would have been most undesirable if not impossible. Limitations described in Class 3 and 4 may exist in Class 5 areas. A limited amount of these soils exist in the County with some located in Bathurst township.

Class 6

In this class soils are only capable of producing perennial forage crops. Improvements are not feasible. The limitations are so severe that these soils can only be used for grazing. They are found extensively in the east and cover most of Montague and Beckwith Townships.

Class 7

These soils have no capability for arable cultivation or permanent pasture. They are primarily areas of non-soil or exposed rock that are of no benefit to agriculture. This is the most extensive single soil class encompassing the the western one-half of Lanark County (Figure 2.4). Many Townships such as Lavant, Darling, Dalhousie, North and South Sherbrooke are almost totally covered by this soil class.

Organic Soil

This type of soil is not given a capability classification since much of it is not utilized for agricultural production. Although scattered throughout the county these organic deposits are found in low, wet areas predominantly in the eastern Townships of Montague, Beckwith and Drummond.

The major soils of Lanark according to their CLI capability (Table 2.1) exhibit some interesting physical characteristics pertaining to soil quality. One half of the County (50.4 percent) is in Class 7 soil which has no agricultural capability. In addition to this large area (Figure 2.4), organic soils consist of another 14.2 percent

of unused land. In total, 64.6 percent of Lanark is either too rocky or too swampy for farming of any sort.¹⁴

TABLE 2.1

Soil Capability of Lanark County

Class	Acres	Percentage of the County
1	23,800	3.27
2	59,300	8.14
3	21,400	2.94
4	32,100	4.41
5	3,600	.49
6	118,100	16.22
7	367,400	50.44
Muck (Organic)	103,300	14.18

Source: Soil Survey of Lanark County, Report No. 40 of Ontario Soil Survey, Canadian Department of Agriculture and the Ontario Department of Agriculture and Food, p. 17.

Soil Capability of Lanark County

Figure 2.4

Source: Canadian Dept. of Agriculture,
 Soil Survey of Lanark County, Report No. 40.

Areas primarily suited for forage crops, consisting of Classes 5 and 6, amount to 121,700 acres or almost 17.0 percent of the total acreage. Soils with low to medium capability, such as Class 4, account for just over 4 percent of all lands.

The better soils of Lanark County, according to the C11¹⁵ are identified by capability classes of 1, 2 and 3 and amount to 14.4 percent of the classified land. This small percentage of good soil means that Lanark ranks as one of the less productive counties of Southern Ontario.¹⁶

To a great extent much of present day Lanark's land use patterns reflect soil capability. This, however, was not always the case, especially when many of the settlers of the nineteenth century were unwary, new arrivals from the British Isles and not totally familiar with the Ontario landscape. Because of this factor, settlement in Lanark, as in many parts of the province, took place on a variety of soils with little knowledge of their capabilities. Presumably, this inexperience lasted only for a short period of time until the new farmer became more familiar with his land and obtained some knowledge of the soil and its capability.

The dominant region of non-agricultural land in Lanark is situated primarily on the Precambrian Shield. It was, and still is, an area more suited to forestry than farming. Agriculture is very limited in this region, usually

consisting of isolated pockets of grazing land. There were attempts, however, in the last century, under settlement schemes, to encourage settlers to farm these unproductive lands in hopes of developing the region.

2.7 The Early Farmscape

The soils of Lanark were known to be poor in the early nineteenth century. Evidence of this is found in various sources of information such as letters, newspapers, surveyors' reports, the census and agricultural periodicals.

The land to which the first settlers came was not described as being the best for farming. An early surveyor's report in 1797 commented on the stoniness, the thin soils and the numerous swamps that were characteristic of Montague Township.¹⁷ Smith, approximately fifty years later, writing on the progress of Canada and travelling through the most fertile section of the same township, was somewhat disappointed in the poor quality of the farms situated on lands that were partially good, although the remainder was rough and stony.¹⁸

Further north, Smith described the progress in the region around Perth as being substantial but that good agriculture was somewhat lacking in comparison to the more favourable areas of the province.¹⁹

Letters written to friends and relatives by settlers arriving in the 1820's and 1830's on new lands in Dalhousie and Lanark Townships, describe the region as being hilly²⁰ as well as beautiful, with not all that much good land and a great deal of rock and swamp.²¹ Much of Lanark County proved to be unfit for agriculture as is evident in Pakenham. A surveyor's report of this Township in 1823 described the majority of the lots as containing 'hard land' and 'rocky land' on which hemlock and pine grew.²² The better soils in this region existed close to the Mississippi River and further east where the same survey notes record lots with 'good', 'handsome', 'excellent' and 'arable' lands. There were also areas of 'low land', 'swamp' and 'marsh' scattered throughout the Township.²³

The 1851/52 Census of individual townships of Lanark contains remarks by the enumerators on the agricultural capability and describes them in general terms. The same census of South Sherbrooke, a township almost entirely within the Canadian Shield and mainly consisting of Class 7 soil, was described by the enumerator as not fit for farming but more suited to lumbering since it was covered in pine and the land was rocky.²⁴ North Burgess in 1851 was described by another enumerator as being mountainous and swampy except for two concessions in the north where the land was more fertile and possessed agricultural capability.²⁵

Not all of Lanark was agriculturally deficient. The CLI and the 1823 Surveyor's Report. (Pakenham) noted prime farm land in the northeastern portion of the County where a traveller in 1841 commented on how settled and prosperous the farmers were in Pakenham and Ramsay Townships. They had thriving farms that contributed to a pleasant rural scenery.²⁶ A local newspaper, the "Bathurst Courier," in 1853 also had favourable words for Ramsay, reporting that the region was abundant in fertile land with extremely well-to-do farmers.²⁷ Drummond and Bathurst Townships in 1816 were recorded by the land surveyor, Reuben Sherwood, as having substantial areas of 'good land' and 'level land' (consistent with CLI Figure 2.4) and intermittent 'low land', 'swamp' and 'marsh'.²⁸ This particular survey was carried out just prior to the first major settlement of Lanark County, in and around the vicinity of Perth.

Such was the description of Lanark's farmscape from various written sources of the early and mid-nineteenth century. It appears from these accounts that only a small section of the County was blessed with good agricultural land with additional areas being marginal and a majority of the lands unfit for farming. These general nineteenth century descriptions are similar to the picture presented by the CLI of a county possessing limited good farm land, with a substantial portion not suited to agriculture.

2.8 Forests

When Europeans first came to North America, it was the immensity and grandeur of the forests that amazed them. References were often made to the size of trees such as pines that grew to heights of 150 to 200 feet.²⁹ A description by an early author on Upper Canada relates how the forests resembled a vast green carpet covering gently rolling hills.³⁰ A traveller in 1841 commented upon 'the deep masses of wood' and 'immense quantities of the finest timber' that existed in the region of the Ottawa Valley.³¹

The forests that are present in Lanark County today are but a mere shadow of what existed in the early nineteenth century. Some of the first individuals to describe the primeval forests were land surveyors sent to parcel the soon-to-be settled regions into concessions and lots. A surveyor was required to keep a field notebook in which he recorded physical features such as trees and land types that were encountered along a survey line. Such a field notebook, dated 1823, exists for Pakenham Township³² and will be used to illustrate the type of vegetation that was found in Lanark County prior to settlement. Pakenham is used to represent the county because it is characteristic

of Lanark with its topography and typical of the early forest landscape of the region.

A portion of this field notebook is illustrated by Table 2.2 which represents lots 7 and 8 of the 9th concession. A short description of each lot is given in chain length segments with the land type stated first and then followed by the forest cover. Historical geographers who have used field notebooks, Gentilcore and Heidenreich, among others, consider the sequence of the treetypes as representing the relative abundance of each.³³

Adhering to this method of recording, and applying it rationally to lot 7 of Table 2.2, the predominant tree type over the entire lot was beech, followed by maple and elm. In neighbouring lot 8, the most prevalent type of tree was maple, followed by pine over most of the lot, and then by ash and cedar.

This recording method produced over 55 different tree-type combinations in the Pakenham land survey, too large to establish a meaningful pattern. However, using the most commonly found tree on each lot decreases the number of major tree species to 14 which can be further reduced to hardwood and softwood forests (Figure 2.5).

Lanark County, for the most part, like Pakenham Township, can be divided into separate hardwood and softwood

TABLE 2.2

A SEGMENT OF PAKENHAM'S 1823
SURVEYOR'S FIELD NOTEBOOK

Concession	Lots	Chains	Remarks
9	7	14	good land, beech, maple, elm
		1	to large creek
		15	creek
	8		good land, beech, maple, elm
		10	rocky land, maple, ash, cedar
		18	good land, maple, pine to
			spring creek
		2	good land, maple, pine
Source: Surveyor's Report of Pakenham Township by Rueben Sherwood, 1823			

forests. The ~~two~~ major topographical features which occur in the county - the Canadian Shield and Limestone Plain - have a controlling effect on the vegetation. This is caused by the soil capabilities of the two regions which are often an indicator of the type of vegetation that will be found growing. Comparing the soil map (Figure 2.4), concentrating on Pakenham Township, to the vegetation map (Figure 2.6), one notices a definite relationship between the spatial patterns of the soil and the forest types.

15. Land Capability for Agriculture, Op. Cit., 1976, p. 21.
16. L.G. Reeds, Op. Cit., 1972, p. 12.
17. G.L. Lockwood, "Irish Immigrants and the Critical Years in Eastern Ontario: The Case of Montague Township 1821-1881," in Canadian Papers in Rural History, (ed.) D.H. Akenson, IV, (Gananoque, 1984), p. 158.
18. W.H. Smith, Op. Cit., 1852, p. 317.
19. Ibid, pp. 322-323.
20. R. Lamond, "A Narrative of the Rise and Progress of Emigration from the Counties of Lanark and Renfrew," Canadian Heritage, (Ottawa, 1963), p. 50.
21. Ibid., p. 105.
22. R. Sherwood, Surveyor's Report of Pakenham Township, Lanark County, 1823.
23. Ibid, 1823.
24. P.A.C., Enumerators description of landscape, Canada West Census, 1851, Lanark County, South Sherbrooke Township, Reel No. C-11731.
25. P.A.C., Enumerators description of Landscape, Canada West Census, 1851, Lanark County, North Burgess Township, Reel No. C-11731.
26. Mississippi Valley Conservation Report, History, Ontario Department of Energy and Resource Management, (Toronto, 1970), p. 34.
27. P.A.C., Bathurst Courier, Perth, April 22, 1853.
28. R. Sherwood, Surveyor's Report of Bathurst and Drummond Townships, Lanark County, 1816.
29. G. Wynn, Timber Colony (Toronto, 1981), p. 14.
30. J.C. Geikie, Adventures in Canada or Life in the Woods, (Philadelphia, 1870), p. 144.

The limits of the softwood forest very closely follow the outline of the soil-poor Canadian Shield (Soil Class 7). "A similar association exists between the better class soils and the hardwood forests of Pakenham.

The predominant trees growing on the better soils in 1823 were maple, basswood, beech, elm and certain types of oak and ash. On the poorer and rocky areas of the Shield the most commonly occurring trees were hemlock and pine, while the swamps and bogs grew cedar, tamarack and spruce.

Early nineteenth century Pakenham Township and Lanark County can therefore be said to have had two distinct types of forests, frequently intermingled with swamps and marshes.

2.9 Summary

Lanark had a rugged landscape of immense forests cut by frequent rivers. Early accounts reported certain lands in the eastern portion of the County as fertile, while most of the region was agriculturally-poor and rocky.

Geologically, there are noted distinctions within Lanark between the Shield and non-Shield regions; this is mirrored in a two-fold division with which there are strong vegetation associations. While the modern soils map does not give a completely accurate picture of natural condi-

tions and certainly does not add to the perception of abundant fertile soils, there is evidence in existing records that the farmers of Lanark were, or should have been, aware of this broad dichotomy. Certainly by the mid and latter part of the nineteenth century the development of the urban network and rail connections was into the eastern part of the County, leaving the western and northern parts, which were mainly covered by Shield and coniferous forests, relatively unsettled. In the chapters that follow the pattern of settlement is described for these areas and the differences in agriculture is evaluated.

FOOTNOTES

1. P.A.C., Census of the Canadas, 1851/52, County of Lanark, Vol. I (Quebec, 1853), pp. 14-15.
2. P.A.C., Published Census of Canada for 1870/71, Vol. III, Table XXI, Province of Ontario, Lanark County.
3. Ibid, Vol. III, Table XXI.
4. W.H. Smith, Canada: Past, Present and Future, Vol. II, (Toronto, 1852), pp. 318-21.
5. P.A.C., Op. Cit., 1870/71, Vol. III, Table, XXI, Province of Ontario, Lanark County.
6. L.J. Chapman, and D.F. Putnam, The Physiography of Southern Ontario (Toronto, 1966), p. 338.
7. Soil Survey of Lanark County, Report No. 40 of Ontario Soil Survey, Canadian Department of Agriculture and the Ontario Department of Agriculture and Food, (Guelph, 1967), p. 17.
8. Mississippi Valley Conservation Report, Ontario Department of Energy and Resource Management, (Toronto, 1970), pp. 6-7.
9. L.G. Reeds; "The Environment," in Studies in Canadian Geography; Ontario, ed. L.R. Gentilcore, (Toronto, 1972), p. 3.
10. L.J. Chapman and D.F. Putnam, Op. Cit., 1966, p. 338.
11. Soil Survey of Lanark County, Op. Cit., 1967, p. 12.
12. Land Capability for Agriculture, Preliminary Report of Canada Land Inventory, Environment Canada Lands Directorate, (Ottawa, 1976), pp. 3-8.
13. Soil Survey of Lanark County, Op. Cit., 1967, Soil Capability Map, North and South Sheets.
14. The total area for each soil class was calculated from information on soil groups and their capability in the Soil Survey of Lanark County, Report No. 40, Op. Cit., 1967.

15. Land Capability for Agriculture, Op. Cit., 1976, p. 21.
16. L.G. Reeds, Op. Cit., 1972, p. 12.
17. G.L. Lockwood, "Irish Immigrants and the Critical Years in Eastern Ontario: The Case of Montague Township 1821-1881," in Canadian Papers in Rural History, (ed.) D.H. Akenson, IV, (Gananoque, 1984), p. 158.
18. W.H. Smith, Op. Cit., 1852, p. 317.
19. Ibid, pp. 322-323.
20. R. Lamond, "A Narrative of the Rise and Progress of Emigration from the Counties of Lanark and Renfrew," Canadian Heritage, (Ottawa, 1963), p. 50.
21. Ibid., p. 105.
22. R. Sherwood, Surveyor's Report of Pakenham Township, Lanark County, 1823.
23. Ibid, 1823.
24. P.A.C., Enumerators description of landscape, Canada West Census, 1851, Lanark County, South Sherbrooke Township, Reel No. C-11731.
25. P.A.C., Enumerators description of Landscape, Canada West Census, 1851, Lanark County, North Burgess Township, Reel No. C-11731.
26. Mississippi Valley Conservation Report, History, Ontario Department of Energy and Resource Management, (Toronto, 1970), p. 34.
27. P.A.C., Bathurst Courier, Perth, April 22, 1853.
28. R. Sherwood, Surveyor's Report of Bathurst and Drummond Townships, Lanark County, 1816.
29. G. Wynn, Timber Colony (Toronto, 1981), p. 14.
30. J.C. Geikie, Adventures in Canada or Life in the Woods, (Philadelphia, 1870), p. 144.

31. R.S. Bonnycastle, The Canadas in 1841, Vol. 2, (London, 1841), pp. 90-93.
32. R. Sherwood, Op. Cit., 1823.
33. R.L. Gentilcore, "Lines on the Land," Ontario History, 61(2), 1969, pp. 57-73; C.E. Heidenreich, Huronian: A History and Geography of the Huron Indians 1600-1650, McClelland and Stewart, (Toronto, 1973), pp. 3-15.

CHAPTER THREE

SETTLEMENT AND TYPES OF SLTLERS

CHAPTER THREE

SETTLEMENT AND TYPES OF SETTLERS

3.1 Purpose

This chapter looks at settlement and ethnicity in Lanark County generally, and then specifically at the Shield region which was settled after 1850. Its purpose is two-fold: to establish the historical development and conditions of settlement and to introduce a typology of settlers which is investigated later in the thesis.

3.2 Early Settlement

The major period of settlement for most of the county occurred during the first three decades of the nineteenth century.

Surveyed in 1794, the township of Montague was settled by only a few Loyalists before 1800. By 1810, almost one-half of the township was granted by the Crown to absentee owners living outside of Montague, who were either Loyalists or children of Loyalists.¹ With additional land

being reserved for the Crown and Clergy, a mere 13 percent was available for settlement in the 1830's when significant numbers of Irish settlers arrived. The construction of the Rideau Canal along the southern section of Montague attracted many Irish labourers, who quite often remained and settled in the township.² An additional wave of Irish immigrants came during the 1840's, many of whom settled along the Rideau River in Montague as well as North Elmsley Township.³

One of the most ambitious attempts at colonizing Lanark occurred when the Townships of Bathurst, Drummond and Beckwith (Figure 2.1) were surveyed and settled between 1816 and 1822. Commonly known as the Perth Military Settlement, these three townships received a mixed bag of military and civilian settlers who were given a year's provision of food along with basic farm tools, blankets and clothing.⁴ In the first year of settlement, 1400 persons had been placed by settlement agents within these townships. Many of the settlers had cleared six to ten acres of land and were already growing wheat.⁵

A majority of the settlers who came to Beckwith, Drummond and Bathurst townships were from Scotland, while a smaller number came from Ireland and England. The Industrial Revolution in Great Britain had displaced many of these people from their lands and jobs, forcing several to

immigrate to Upper and Lower Canada in hopes of finding a solution to their problems of unemployment, starvation and poverty.⁶

Beginning in 1815, in Glasgow and Greenock, Scotland, various emigration societies were organized to obtain assistance from government and private enterprise for persons wanting to migrate to the Canadas.⁷ Between 1820 and 1821 as many as 2,900 Scots embarked from Glasgow heading for Lanark County and the Johnstown District.⁸ Many of these new arrivals took up residence in Dalhousie, Lanark and Ramsay Townships (Figure 2.1).⁹ Agriculturally, Ramsay was the most suited and thickly populated in the county. In 1842, it contained 2,461 inhabitants and by 1845, 10,659 acres of cultivated land.¹⁰

The next largest group of immigrants to arrive were the Peter Robinson Irish, who settled Pakenham and Ramsay in 1823.¹¹ In total, 578 adults and children made the journey from Ireland and received grants of land in the two townships.¹² Each male 18 years of age or older was given 70 acres of land with an option to obtain an additional 30 acres once certain settlement duties had been completed.¹³ Each family was given rations of food, bedding, tools, seed and one cow to assist them before crops could be sown and harvested to provide food and income.¹⁴

The main crops of the Irish in Ramsay and Pakenham were potatoes, turnips and grains of which probably a great deal were sold to the lumbering sector.¹⁵

Almost all of the good agricultural land of Lanark County (Figure 2.4) was occupied by the 1830's. Most of the townships of the Precambrian region, however, were very sparsely settled, especially Darling and Lavant. As poor soil was predominant in this region, many of the settlers were unable to produce sufficient crops, had farms that were of a very low standard¹⁶ and, as a result, further settlement was discouraged.

3.3 Later Settlement: Colonization Roads

In 1854 the first colonization roads were introduced to encourage settlement on the Precambrian Shield. One of these colonization roads was the Darling and Lavant Road (Figure 3.1), which extended for seventeen miles through the northwest corner of Lanark County. This road was constructed between 1858 and 1866 at a cost of about \$11,000,¹⁷ and went through an area of the county that was heavily forested and unsettled.

The purpose of this road and others constructed in neighbouring counties of Renfrew, Frontenac, Lennox-Addington and Hastings was two-fold. First, it was

Lanark County Colonization Roads, 1866

Figure 3.1

Source: G.W. Spragge, Colonization Roads
in Canada West, 1850-1867

intended to lure settlers into the unpopulated regions of Ontario which describes a good portion of Lanark. Second, it was to aid the lumber shanties in providing roads for bringing in bulky supplies.¹⁸ An additional advantage to the lumberman was that the settlers along the colonization road were encouraged to sell their agricultural products to the shanties in attempts to reduce the cost of freighting in goods from outside the region.¹⁹

For a short period of time the settlement scheme seemed promising, but by the early 1860's, it became apparent that the colonization roads were proving unsuccessful. Once the lumber camps began to move further into areas remote from the roads, they left behind stranded settlers who could not survive agriculturally on the poor soils of the Canadian Shield,²⁰ thus forcing many of them to abandon their lands.

3.4 Settlers' Indecision

Lanark County, from the early nineteenth century, proved to be a region more suited to lumbering than agriculture. There were mixed feelings by the settlers as to whether to participate in the forestry sector, or in agriculture. Lanark became an area similar to New Brunswick, where lumbering played such an important role that settlers were part-time farmers in the summer and lumbermen in the winter.²¹

This type of existence proved detrimental to the agriculture of the county.

The dwelling and farm buildings are of a very poor description, and much of the land appears badly farmed...for farmer he does not deserve to be called.²²

This mixed-mode economy was obviously not to everyone's liking, as is evident by the following:

...throw off their character of half farmer, half shantyman...the sooner they...start for California the better for themselves.²³

As much as there was uncertainty in this combination of lumbering and agriculture, settlers still gained from this situation. They could work as teamsters in the shanties, hauling logs in the winter, or spend their time freighting in supplies to the camps.²⁴ Logs cut by the settler, along with agricultural produce, could be sold directly to local lumbermen instead of transported to distant markets.

Although there has been criticism of this farmer-lumberman type of economy, there were many things in favour of it. Lanark County and the Ottawa Valley were an exception to all other areas of Ontario, because of the timber trade. The forestry sector provided the settlers with a ready market for agricultural produce right at their front door step. This did not exist in the rest of the pro-

vince.²⁵ As a result, agriculture in Eastern Ontario was different than in other parts of the province; it changed in response to lumbering. Several types of farmers appeared rather than the single wheat farmer. These are described below and, drawn largely from the work of A.R.M. Lower, they identify types of farmers closely associated with lumbering.

3.5 Typology of Settlers on the Forest Frontier

a) The New or Poor Farmer

Perhaps because he was located on inferior soil or had just purchased or been granted a farm lot which was not cleared, this settler was unable to sustain himself; possibly he lacked enough cultivated land to do so. He therefore found it necessary to work as a lumberjack to supplement his income.

b) The Teamster

This settler was more fortunate than his poor neighbour and had a team of oxen or horses which were put to use in the winter by working in the lumber camps where they pulled logs or hauled in supplies.

c) The Farmer-Lumberman

Cutting lumber in winter on his own lands, this settler sold timber to the local shanty operators or sawmills. In earlier days before there were large lumbermen to sell to, the settler would have attempted to float his logs to Ottawa by himself. By 1850, however, the small entrepreneurs had given way to the large operators who were hiring numerous men to work in countless lumber camps.²⁷

d) The Established Farmer

With sufficient lands on which to grow and raise a variety of crops and livestock, this individual supported himself entirely by farming and sold his produce directly to the shanties. If the farm was located a distance from the shanties, but near a town, the settler would then sell his produce to local merchants or dealers.

The settlers who came to farm on lots that were close to the lumber camps were not all of the same character as those just described,²⁸ who were found on the more established lands. Lower describes these additional types of settlers as:

e) The Shanty Farmer

Perhaps this settler first worked in the lumber camps and turned to farming when he received a land grant. He might have requested a specific lot because he saw some agricultural potential in the land from which crops and livestock could be sold to the shanties. In the winter, to supplement his income, the farmer worked as a lumberjack. In essence similar to the new or poor farmer identified earlier, the shanty farmer differed in location. These settlers were found specifically in lumbering areas.

f) The Timber Harvester

This type of settler obtained a grant but never became a farmer. He chose the lot because of the good timber, which was cut and sold to the lumbermen. When his lot was cleared, the settler moved on without paying further installments.

g) The Squatter

This type of individual was quite frequently found along the colonization roads and other areas of Lanark where land was abundant and the shanty market was close at hand. Squatters, similar to the shanty farmer, were mostly farmers in summer who sold their farm products to the lumber camps and then turned lumberjack in the winter.

3.6 Summary

This chapter described the timing of settlement from the initial exploitation of the better farm land in the early years of the nineteenth century to the subsequent penetration of the Shield. Colonization was sponsored by the military and by immigration societies, and in the later years was promoted via colonization roads. In Lanark County the settler had a choice, depending upon his experience, his location, and his pre-disposition to work as either farmer or lumberman. In fact, his range of choice was broader than just farmer or lumberman, as Lower suggests in his typology, which stressed the lumbering dimension in the agricultural mix. The question of whether or not discrete classes did exist is theoretical; whether

these classes are detectable is a methodological question addressed in subsequent chapters. The importance of lumbering and its effect on agriculture is a given fact, which is why lumbering is the central focus of the next chapter.

FOOTNOTES

1. G.L. Lockwood, "Irish Immigrants and the Critical Years in Eastern Ontario: The Case of Montague Township 1821-1881," in Canadian Papers in Rural History, D.H. Akenson, (ed.), IV, (Gananoque, 1984), p. 158.
2. Ibid., p. 160.
3. J.S. McGill, A Pioneer History of the County of Lanark, (Toronto, 1968), p. 101.
4. Ibid., p. 17.
5. A. Haydon, Pioneer Sketches in the District of Bathurst, vol. 1, (Toronto, 1926), pp. 49-50.
6. J.S. McGill, Op. Cit., pp. 4-7.
7. J.M. Camerson, "The Role of Shipping from Scottish Ports in Emigration to the Canadas, 1815-1855," in Canadian Papers in Rural History, (ed.) D.H. Akenson, Vol.II, (Gananoque, 1980), p. 139.
8. R. Lamond, "A Narrative of the Rise and Progress of Emigration from the Counties of Lanark and Renfrew," Canadian Heritage, (Ottawa, 1976), p. 1.
9. Ibid., p. 50
10. W.H. Smith, Canada: Past, Present and Future, vol.II, (Toronto, 1851), p. 332.
11. J.S. McGill, Op. Cit., p. 90.
12. V.R. McGiffin, Pakenham, Ottawa Valley Village, 1823-1860, (Pakenham, 1968), pp. 27-28.
13. Ibid., p. 25.
14. Ibid., p. 35.
15. J.S. McGill, Op. Cit., p. 100.
16. P.A.C., Canada West Census 1851-52, Personal Schedule, Enumerators' description of farms in the Canadian Shield area of Lanark County, Lanark North, Lanark Township, C-11732.

- 17.. G.W. Spragge, "Colonization Roads in Canada West, 1850-1867," Ontario History, 54,1 (1957), pp. 10-13.
18. H.E. Parson, "An Overview of Landscape Assessment and Settlement Policy on the Southern Ontario Section of the Canadian Shield in the Nineteenth Century," Ontario Geography, 22 (1983), p. 25.
19. A.R.M. Lower, "Assault on the Laurentian Barrier," Canadian Historical Review, 10 (1929), p. 301.
20. G.W. Spragge, Op. Cit., p. 15; H.E. Parson, Op. Cit., p. 23.
21. G. Wynn, Timber Colony, (Toronto, 1981), pp. 72-78.
22. W.H. Smith, Op. Cit., p. 317.
23. History, Chapter X of the Mississippi Valley Conservation Report 1970, Department of Energy and Resource Management, (Toronto, 1970), p. 24.
24. R.L. Jones, History of Agriculture in Ontario 1613-1880, (Toronto, 1946), p. 115.
25. A.R.M. Lower, "Settlement and the Forest Frontier in Eastern Canada," in Canadian Frontiers of Settlement, (eds.) W.A. Mackintosh and W. Joerg, (Toronto, 1936), p. 46.
26. Ibid., p. 45.
27. W.T. Easterbrooke and M.H. Watkins, Approaches to Canadian Economic History, (Toronto, 1967), p. 48.
28. A.R.M. Lower, Op. Cit., p. 301. 6

CHAPTER FOUR

THE FOREST INDUSTRY AND FARM PARTICIPATION

CHAPTER FOUR

THE FOREST INDUSTRY AND FARMER PARTICIPATION

4.1 Purpose

Because the lumber industry had such an important effect on the farmers and agriculture of Lanark County, it is necessary to discuss some of the important aspects of the industry such as its history, its nature, its markets and the volume of cut timber. This chapter will also examine some of the main regions of the county where farmers in 1871 were participating in the forest industry by removing from their own lots considerable amounts of assorted timber and pine.

4.2 Lumbering in Lanark County and the Ottawa Valley

The needs of the shanties in Lanark around 1870 were certainly great, as is evident from Table 4.1, which provides a list of the 19 major lumber operators in the county and their requirements for quantities of food and men.¹ In the same year the lumber industry in the Ottawa Valley consumed 24,000 barrels of pork, 12,000 tons of hay and 550,000 bushels of oats.²

TABLE 4.1
List of Major Lumber Operators

Name of Operator	Logs Taken Out	Men Employed in Mill and Yard	Men Employed on Drive	Shanty Teamsters and Choppers	Tonnes of Hay	Barrels of Pork	Barrels of Flour	Bushels of Oats
Gilles and McLaren	80,000	150	100	250	1,200	unknown	Unknown	9,000
Ennis	8,000	8	10	33	11	28	35	1,200
A. Code	6,000	11	10	25	9	18	24	900
Caldwell and Son	40,000	40	22	80	60	150	200	6,000
J.J. Playfair	4,000	12	14	30	16	40	80	1,000
William Lees	10,000	14	16	32	20	40	60	1,200
Playfair and Steadman	12,000	20	22	28	12	50	100	1,000
John Playfair	6,000	15	10	25	9	30	50	700
John Laurie	2,000	10	8	20	6	20	35	500
William Doran	9,000	9	6	21	14	35	10	900
J. Morrow	3,000	6	7	6	3	10	18	200
Messrs. Goldman	3,000	8	6	6	3	11	18	200
Richard Deacon	4,000	8	6	15	8	15	26	500
William Ritchie	2,300	3	6	12	6	14	10	400
John Corry	2,500	3	5	13	6	14	9	400
James Scott	2,000	3	6	10	6	10	18	350
William Allen	3,000	8	8	20	9	22	35	500
John Allan, Upper Mill	5,000	5	10	25	13	32	32	1,300
Perth Mill	5,000	5	--	--	--	--	--	--
Hargrave and Dodds	5,000	15	6	18	10	25	40	700
Frost and Wood	5,000	10	10	20	10	20	35	800

Source: Perth Courier, April 29, 1870.

Lumber became such an important staple product of the 1800's that it accounted for nearly two-thirds of all the exports to Great Britain and it was not until 1850 that it eventually gave way in importance to grain and flour.³

The first raft of timber to come down the Ottawa River, destined for Quebec City, was sent in 1807.⁴ From that time until about the mid 1830's all squared timber was directed through Quebec City to markets in Great Britain. The British market was predominantly interested in squared pine, which was abundant in areas surrounding the major rivers of Lanark, one of which was the Mississippi.

After the completion of the Rideau Canal, many of the settlers in the southern portion of the county who were active in lumbering, began to turn their attention to sawn-lumber for which there was a demand in the north-eastern United States. The first shipment of saw-logs was sent down the canal to Kingston and then across Lake Ontario to Oswego in 1836.⁵ The American market was not as demanding as that of Great Britain, but accepted most types of lumber, not just pine.⁶

In 1846 Great Britain dropped its tariff on foreign imports, allowing Baltic timber to enter English ports.⁷ As a result of this, there was a decrease in wood exports from Quebec City and New Brunswick which caused a depression that would last for several years.⁸ Exports of timber to

the British Isles were greatly diminished, as is evident in Table 4.2 showing the huge remaining stocks that could not be cleared at Quebec City.⁹

Great efforts were made to increase exports of timber to the United States to compensate for the diminished British market. Fortunately, a Reciprocity Treaty was signed in 1854 between Canada and the United States which allowed the shipment of goods across the border with no restrictions.¹⁰ Increased population and urban expansion in the United States caused American supplies of lumber to be rapidly depleted. These shortages, in conjunction with newly completed canals and natural waterways that existed in both countries, plus available American capital, tremendously encouraged the export of Canadian wood.¹¹ By 1870, American demands on the Ottawa Valley exceeded those of Great Britain, accounting for 250,000,000 board feet in comparison to 50,000,000 board feet and 18,000,000 cubic feet of squared timber going to English markets.¹²

Most of the squared timber that was in Lanark County came from townships through which the Mississippi River and tributaries of the Madawaska flowed. In 1863, a total of 7,800 pieces of squared timber passed via the Ottawa chutes arriving from private lands in Lanark.¹³

TABLE 4.2				
Quebec City Timber Stocks (Cubic Feet)				
Year	1845	1846	1847	1848
Stock on Hand	7,702,344	3,479,344	16,537,298	25,856,371
New Supply	<u>20,000,000</u>	<u>37,300,642</u>	<u>27,927,253</u>	<u>14,090,407</u>
Total	27,702,344	40,779,986	44,927,251	39,447,778
Exports	<u>24,223,000</u>	<u>24,242,688</u>	<u>19,060,880</u>	<u>17,402,360</u>
Stock Remaining	3,479,344	16,537,298	25,856,371	22,045,418

Source: A.R.M. Lower, Great Britain's Woodyard, 1973, p. 115.

From this amount only 900 pieces came from townships south of the Mississippi, close to the Rideau River. A similar situation occurred in 1867 when the amount of squared timber, this time from Crown lands, was again greater in the northern and western sectors of the county (5,300 pieces), than in the southeast (200 pieces).¹⁴ This north-south division of lumbering was also verified by the 1871 Canada Census of Lanark County which records 704,084 cubic feet of cut and squared pine harvested in North

Lanark while South Lanark produced only 7,520 cubic feet.¹⁵ North Lanark's considerable pine production made it one of the leading lumbering regions of the province, behind only Renfrew, Nipissing and Simcoe Counties. According to the Census, North Lanark consisted of the townships of Pakenham, Ramsay, Lanark, Darling, Dalhousie, North Sherbrooke and Lavant, while South Lanark included Beckwith, Drummond, Bathurst, South Sherbrooke, North Burgess, North Elmsley and Montague.¹⁷ The townships of North Lanark were tied to the squared pine trade which catered to the British market via the Ottawa River. In contrast to this were the counties of South Lanark which, by 1870, became an important region of sawmills that cut sawlogs and planks rather than squared pine, and exported to the United States by the Rideau Canal system or railway.¹⁸ South Lanark, which harvested 867,330 cubic feet of timber, other than pine, was second in production only to Essex County.

4.3 The Distinct Regions of Farmer Lumbering

The division between the two regions of lumbering in Lanark was also evident in the type of timber cut by its farmers. In Chapter three, a typology of farmers participating in the timber trade was presented. The 1871

census, which includes in the enumeration returns enough variables, permits the identification of individuals within this typology. The variables of cubic feet of squared pine, pine logs, cubic feet of other squared timber and other timber logs from the census give a good indication of where and what type of lumbering was a major activity of farmers in Lanark County. By inference, one can argue that where there was a marked concentration of lumbering on the part of individual farmers, it occurred within or adjacent to a major lumbering district.

Figure 4.1 displays the systematic sample of 385 points which represent individual farmers in the county in 1871. These were located in the Census of 1871 using lots and concessions. A more detailed description of the 1871 variables, along with 1851/52 variables and sampling methods, is discussed in Chapter Six, which also outlines the XY coordinate system used to produce the plots displayed in this chapter and those that follow. Figure 4.1 shows the exact location of each sample point. If these sample points are compared to the concentrated areas of farmer-lumbering on each of the plots in this chapter (Figures 4.2-4.5), there is anywhere between 3 and 10 sample points that make up a major concentration.

Figures 4.2 and 4.3, which represent cubic feet of squared pine and pine logs show such concentrations in

Lanark County Systematic Sample Locations, 1871

Figure 4.1

Source: Compiled by Author

Cubic Feet of Squared Pine for 1871

Figure 4.2

Source: Compiled by Author

Darling Township lying south-west of White Lake and between the watershed of the Madawaska and Mississippi Rivers. All major squared pine and pine log cutting areas in Lanark were within reach of the Mississippi River (Figure 2.3).

Even the lumber region, located in South Sherbrooke, is situated north of Christie Lake, on the watershed of both the Rideau and Mississippi Rivers.

In contrast to the predominantly pine regions, Figure 4.4 represents clusters of all other squared timber cut within Lanark County. These areas are primarily within reach of the Rideau River, especially those found within Beckwith and Montague Townships. Harvests of timber logs (Figure 4.5) other than pine are concentrated in Burgess Township close to the Rideau River and quite separate from the squared timber trade.

The pattern represented by the pine and other timber tracts indicate two distinct spheres of forestry. To the west and north is a squared pine and pine lumbering region with access to the Ottawa River by way of the Mississippi and Madawaska. Focused on squared pine and pine logs, this area of Lanark, as mentioned already in the previous section, frequently catered to the British market by way of Ottawa and Quebec City. The overseas market of Great

Pine Logs for 1871

Number of Logs

Figure 4.3

Source: Compiled by Author

Cubic Feet of Squared Timber for 1871

Figure 4.4

Source: Compiled by Author

Timber Logs for 1871

Figure 4.5

Source: Compiled by Author

Britain was rather selective, usually accepting only squared white and red pine rather than a variety of timber.²⁰

The second domain of lumbering revealed by Figures 4.4 and 4.5 is that of a non-pine forestry region consisting of squared and regular timber logging. Centred in the eastern and southern portions of the county, these areas of lumbering were cutting all types of trees and shipping to the United States via the Rideau Canal and the Brockville-Ottawa Railway.²¹

The type of settlers that contributed the most to the major tree cutting areas of all the various plots, were the less established farmers such as the 'farmer-lumberman' or 'timber harvester' who spent all or a good part of his time cutting and selling timber. The remaining areas concentrated less on lumbering (Figures 4.2 to 4.5) and consisted of farmers who range from the more 'established farmer', who did very little lumbering, to the 'teamster', 'poor farmer' or 'squatter', who did less cutting of their own timber, but instead worked in the lumber camps in winter to supplement their income. There are also some areas on the plots where there was no settlement recorded by the census such as in Lavant Township.

4.4 Summary

Lumbering in Lanark was extremely important, so much so that in 1871, it made the county one of the leading timber producing regions in Ontario. The major markets for Lanark lumber were in Great Britain and the United States. As a result, there were two different lumbering regions in the County. North Lanark was a region of pine lumbering where squared timber went to the British market, while in contrast, most of South Lanark lumbered a variety of timber that found its way to the American market. Each region used major rivers as a transportation route, the Mississippi-Ottawa Rivers for North Lanark and the Rideau River Canal system for South Lanark.

This division between the different types of lumbering was also evident in the activities of the settlers who participated in the forestry sector. The typology of farmers (Chapter Three) describes some of these as cutting trees from their own lots and contributing to the timber trade. This activity is present in Figures 4.2 to 4.5, showing a rather pronounced division between the various concentrations of harvested timber.

A majority of the regions where settlers contributed to lumbering were adjacent to major rivers that were used by the large lumber operators as a means of transportation.

It was these lumbermen who frequently purchased squared and cut logs from the farmers and helped them dispose of their timber.

The physical division of lumbering very closely resembled the regions of Shield and non-Shield. The Shield areas were and are predominantly a squared pine and pine log region, while other types of timber were cut on the non-Shield areas. Lumbering by certain settlers such as the 'timber harvester' and 'farmer-lumberman' was intensive on the poorer agricultural lands because of the still-abundant forest cover, whereas the best lands by 1871 were already agriculturally established and depleted of timber.

The last two chapters have described a typology of frontier settlers developed through literature; they have also emphasized the importance of lumbering in Lanark County. In the following chapters, however, a more extensive exploration will take place on the types of settlers and agriculture found in Lanark.

FOOTNOTES

1. P.A.C., Perth Courier, Perth, April 1870.
2. H.A. Innis and A.R.M. Lower, Selected Documents in Canadian Economic History 1783-1885, (Toronto, 1933), p. 513.
3. Ibid., p. 274.
4. A.R.M. Lower, Great Britain's Woodyard: British North America and the Timber Trade, 1763-1867, (Montreal and London, 1973), pp. 63-64.
5. A.R.M. Lower, The North American Assault on the Canadian Forest, (Toronto, 1938), p. 99.
6. A.R.M. Lower, Op. Cit., 1973, pp. 127-128.
7. A.R.M. Lower, Op. Cit., 1973, p. 75.
8. A.R.M. Lower, Op. Cit., 1973, pp. 114-115.
9. The table is from A.R.M. Lower, Op. Cit., 1973, p. 115.
10. W.T. Easterbrooke and H. Aitken, Canadian Economic History, (Toronto, 1958), pp. 203-204.
11. A.R.M. Lower, Op. Cit., 1938, pp. 90-91.
12. H.A. Innis and A.R.M. Lower, Op. Cit., 1933, p. 513.
13. C.G. Head, "Nineteenth Century Timbering and Sawlogging in the Ottawa Valley: Documentary Sources and Spatial Patterns," in V. Ivoroffski and S. Campbell (eds.), Exploring Our Heritage: The Ottawa Valley Experience, p. 55.
14. Ibid., p. 55.
15. P.A.C., Census of Canada, 1871, Vol. III, pp. 228-229.
16. P.A.C., Census of Canada, 1871, Vol. III, pp. 224-229.
17. P.A.C., Census of Canada, 1871, Vol. III, Tables XXIII, pp. 146-148.

18. J. Brown, The Sawmills of Ark and Renfrew,
(Mallorytown, 1976), p. 4.
19. P.A.C., Census of Canada, 1871, Vol. III, p. 224.
20. H.A. Innis and A.R.M. Lower, Op. Cit., 1933, p. 513.
21. V.R. McGiffin, Pakenham, Ottawa Valley Village, 1860-1900, (Pakenham, 1967), p. 13.

CHAPTER FIVE

LAND CLEARING AND CROPS

CHAPTER FIVE

LAND CLEARING AND CROPS

5.1 Purpose

In order to obtain a glimpse of Lanark's mid-nineteenth century agricultural land use patterns, and the various types of crops grown, data had to be extracted from the enumeration returns of the 1841, 1851, 1861 and 1871 Census.¹ Use of decennial intervals permitted trends in yields, crop patterns and forest clearance to be established so that the process of farming could be better understood. All four data sets were sampled using a systematic method (Chapter Four) representing individual farmers who were located by lot and concessions. Continuity was maintained between all the data sets by sampling the same lots for each of the four censuses.

The data for 1851/52 and 1871 constitute the major source for analysis in this thesis. They are employed because of the need for strict compatibility in the multivariate procedures used as the basis of analysis in later chapters. In this chapter, they are supplemented by

the Census of 1841 and 1861; all four are used to establish trends in agriculture. Used only in establishing trends, the 1841 and 1861 Census are not employed in subsequent chapters.

5.2 Crop and Pasture Land, 1841 - 1871

In early Canada, lots could be found at various stages of improvement, depending on a settler's industriousness, his available capital, and his time of arrival.² The amount of farm land that was being cleared for crop and pasture in Lanark between 1841 and 1871 is represented on Figures 5.1 and 5.2 showing the progress over a thirty-year period. The percentage of land cleared went up from 21.0 percent to 51.0 percent (Figure 5.1); the cleared land per farm rose from 26 acres in 1841 to 76 acres in 1871 (Figure 5.2). The Lanark figure of 51.0 percent cleared is low compared to a more established county, such as York which had 78.0 percent.³ Information on land clearing in early Ontario is limited; however, one available source was York County, a major agricultural region in the province. Approximately half of each farm lot in Lanark had been cleared by 1871; compared to one-fifth thirty years earlier. The vast majority of this cleared land was

converted to crop land rather than pasture. Crop land increased from 17.0 percent in 1851 to 34.0 percent in 1871, while pasture land remained relatively stable between 17.0 percent and 18.0 percent (Figures 5.3 to 5.4).

Comparing the 1851/52 crop land and pasture land distributions (Figures 5.3, and 5.4) to the soil map (Figure 2.4) and major urban centres (Figure 2.1) revealed no associations. The most intensive crop land, taking into account the missing data, was located in Lanark, South Sherbrooke and Beckwith Townships. The pasture land distribution was more widely spread with major concentrations in Dalhousie, Lanark, Bathurst and Pakenham Township, while smaller concentrations were located in North Burgess, North Elmsley and North Sherbrooke (Figure 2.1).

In 1871, the regions of predominant crop and pasture land in Lanark were rather distinct, if one looks at Figures 5.5 and 5.6. Farms with 45 percent and more crop land lie in regions near the Town of Perth and in the adjoining Townships of Bathurst, Drummond, North Burgess and North Elmsley. North and East of Smiths Falls, close to the Rideau River was another area of significant crop land. Situated on good agricultural land in Ramsay Township was a third major zone of high percentage crop land. This region surrounded the Town of Almonte and extended

THE PERCENTAGE OF AGRICULTURAL LAND PER FARM
IN LANARK COUNTY
1841 - 1871

FIGURE 5.1

Source: Compiled by the author from the P.A.C. enumeration Census returns for Lanark County, 1841 (Reel C-1344), 1851/52 (Reels C-11731, C-11732), 1861 (Reel C-1043), 1871 (Reels C-10017, C-10018, C-10019).

AGRICULTURAL LAND IN ACREAGE PER FARM, LANARK COUNTY 1841 - 1871

FIGURE 5.2

Source: Compiled by the author from the P.A.C. enumeration Census returns for Lanark County, 1841 (Reel C-1344), 1851/52 (Reels C-11731, C-11732), 1861 (Reel C-1043), 1871 (Reels C-10017, C-10018, C-10019).

Crop Land Distribution for 1851/52

Figure 5.3

Source: Compiled by Author

Pasture Land Distribution for 1851/52

Figure 5.4

Source: Compiled by Author

west into Lanark Township and north into Pakenham Township. All the above mentioned areas lay on good to moderate agricultural land (Figure 2.4) located close to an urban centre. In contrast to this, and located in Lavant Township close to Darling, is an isolated pocket of intensive crop land that is not near any urban centre, and located on poorly classified soils of the Canadian Shield (Figure 2.4). At this time major lumber operations were taking place in Lavant, Darling and the adjoining townships of Renfrew County.⁴ With intensive lumbering activities nearby, settlers and squatters had cleared considerable crop land in Lavant Township (Figure 5.5) specifically for the growing of crops to be sold to the nearby lumber camps. These detached concentrations of crop land which were some distance from a town or village, were probably relying directly on the shanties as a market and used the nearby colonization roads (Figure 3.1) as a means of transporting their produce.

A somewhat different pattern appears when the major pasture and grazing lands of Lanark were plotted on Figure 5.6. On this figure, concentrations of pasture are shown to have been located in the Christie Lake region of South Sherbrooke, while a major area in the northern portion of the county is found around White Lake in Darling Town-

Crop Land Distribution for 1871

Figure 5.5

Source: Compiled by Author

ship. In 1871, an additional cluster of pasture land was situated near the Rideau River just west of Smiths Falls.

An examination of Figures 4.2 and 4.5, which represent square pine and timber logging regions of Lanark, reveals some similarities and differences to the pasture and crop land areas of Figure 5.5 and 5.6. The prevalent area of square pine in Darling (Figure 4.2) lay adjacent to and between the major pasture and crop lands near White Lake (Figure 5.6) and Lavant Township (Figure 5.5). The pasture lands in South Sherbrooke were near tracts of square pine (Figure 4.2) and timber logging (Figure 4.5) in the Southern portion of the County.

Except for the area close to Smiths Falls, it appears that the predominant pasture lands of Lanark were located only a short distance from logging regions. This proximity of pasture to logging indicates that a close relationship existed between these two components, more so than between crop land and logging. These large areas of pasture were perhaps created by settlers such as the hypothesized 'farmer-lumberman' or the 'timber harvester' who removed large quantities of trees from their lots, resulting in considerable pasture land, and who sold their timber to nearby lumber camps.

All significant crop lands, except for the one area in Lavant-Darling, were located near urban centres on the

Pasture Land Distribution for 1871

Figure 5.6

Source: Compiled by Author

better quality lands of the limestone and sandstone plain. (Figure 2.4). These regions near the towns represented the more 'established settlers' with considerable crop land who grew produce to be sold to local merchants or dealers, who in turn sold to the shanties. The areas of crop land on the Canadian Shield, such as in Lavant and Darling Townships, were probably 'shanty farmers' or 'squatters' who sold crops and livestock directly to the lumbermen, although there is no absolute proof of this. Many of the crops produced by these Canadian Shield settlers usually required more fertile soils but could be found growing on the less suitable lands. These poorer lands were primarily virgin soils that had a short period of fertility and limited agricultural production, but were momentarily sufficient to grow those crops in high demand by the shanties.

5.3 Ontario Agriculture

Before discussing the agricultural yields and various types of crops grown in Lanark County, it is important to have some general information on the factors affecting nineteenth century agriculture in Ontario.

Perhaps no greater blow was struck against Canadian agriculture than the repeal of the Corn Laws in 1846.

2

MicroD

Canadian flour and wheat, mainly from Ontario, had been exported duty free in great quantities to Great Britain since 1815.⁵ This free trade in wheat had encouraged the farmers of Canada West to plant much of their land in wheat to take advantage of the market conditions. The collapse of the British market was to have a major effect on the transformation of agriculture from a monoculture of wheat to a mixed type of farming in most of Ontario.⁶ On this point, McInnis, McCallum and Kelly agree that this transformation occurred somewhere between the late 1850's to 1870.⁷ McInnis, along with the others, emphasizes the Reciprocity Treaty of 1854 as the major factor that brought about this shift in agriculture because of American needs for a variety of farm products rather than just wheat.⁸ Canadian agricultural exports other than wheat increased from 9.8 percent in 1850-1855 to 39.2 percent in 1866-71. These exports consisted mainly of barley, oats, livestock and dairy products.⁹

The abolition of the Corn Laws and the signing of the Reciprocity Treaty also had its effects on the timber trade in Lanark. These changes, however, did not significantly alter the agriculture of the county. Wheat was not the major crop of the region, as it was in the rest of Ontario; a variety of products were important with oats being the principal cash crop.¹⁰ Not all of Lanark's farm products

were solely for the shanty market. Beef and wool, for example, found their way to American markets as a result of Reciprocity and shortages during the American Civil War.¹¹

5.4 Lanark Farm Products and Crop Yields

The various agricultural products and their calculated means for Lanark farms in 1851/52 and 1871 are listed in Tables 5.1 and 5.2. A comparison between the period 1851/52 and 1871 is made in 'output per farm.' The reason for this is that while the 1851/52 census had agricultural data to produce yields per acre, the 1871 census recorded only agricultural output per farm. Tables 5.1 and 5.2 reflect a decrease in potatoes, corn, wheat and oats from 1851/52 to 1871 which is counter-balanced by an increase in barley, peas and rye output over the same period. The increases and decreases in output between 1851/52 and 1871 do not reflect the substantial rise that occurred for a number of crops in 1861. Figure 5.7 exhibits a cross-sectioned view of yields for wheat, barley, oats, peas, corn and potatoes from 1841 to 1871.

In all cases, the year 1861 had a higher output per farm than the previous decade of 1851. This increase in output partially occurred because crop land had increased between 1851 and 1861 from 20 acres to 35 acres per farm.

TABLE 5.1

1851/52 Agricultural Means of Crops, Animals, Products
and Acreage Per Farm for Lanark County
(N = 271)

Products	Units	Acreage (if applicable)
Wheat (Spring and Fall)	66.9 Bsh	5.0
Barley	15.6 "	0.9
Peas	28.6 "	2.3
Oats	117.9 "	5.2
Corn	19.8 "	1.2
Potatoes	132.9 "	1.6
Rye	20.4 "	2.2
Hay	10.5 Tons	
Oxen (Includes Steers & Bulls)	2.7	
Cows (Milk)	3.7	
Calves	4.3	
Horses	2.5	
Sheep	14.1	
Hogs	4.9	
Wool	37.4 lbs	
Butter	235.7 "	
Cheese	77.3 "	

Source: Calculated by the author from P.A.C. Census
Enumeration Returns for 1851/52 (Reels C-11731,
C-11732)

TABLE 5.2

1871 Agricultural Means of Crops, Animals and Products
Per Farm for Lanark County
(N=385)

Products	Units
Wheat (Spring and Fall)	65.3 Bsh
Barley	26.7 "
Peas	30.5 "
Oats	115.3 "
Corn	13.6 "
Potatoes	117.4 "
Rye	24.4 "
Hay	14.8 Tons
Oxen	1.9
Cattle	5.1
Cows (Milk)	5.0
Horses	2.2
Sheep	14.1
Hogs	5.1
Wool	54.5 lbs
Butter	368.2 "
Cheese	49.3 "

Source: Calculated by the author from the P.A.C. Census Enumeration Returns for 1871 (Reels C-10017, C-10018, C-10019)¹²

MEAN OUTPUT OF CROPS PER FARM

FIGURE 5.7

Sources: Calculated by the author from the P.A.C. Census Enumeration Returns for 1841, 1851/52, 1861 and 1871.

The graphs perhaps indicate that 1861 was a good agricultural year reflecting a time of prosperity in Lanark County, while the year 1871 appears to be one of depression. The rise in agriculture was probably also linked to the profitable year that the forestry sector experienced in 1861 throughout the Ottawa Valley. Exports of timber to the northern states had steadily increased as a result of a population boom that was taking place in New England and New York.¹³ It appears that while the timber trade flourished in Eastern Ontario it was reflected in the amount of agriculture that took place.

The output per farm are not totally indicative of the importance of each crop in relation to the type of agriculture that was evolving in Lanark. Figure 5.8 displays the same crops as Figure 5.7, but represents the percentage to which each was grown on all sampled farms from 1841 to 1871.

The popularity of potatoes as a root crop remains steady in the 90 percent plus range, even though it had fluctuating yields over the same 30 years. Reasons for the fluctuation in yields can be associated with the demands of

the shanties in combination with the noticeable deterioration of the potato plant which was occurring at this time.¹⁴ In addition, wheat and oats were grown by over 80 percent of the farmers and represent the two most important grain crops purchased by the lumber shanties. There was also a rise in the growth of peas, a crop that was deemed essential in the scientific rotation of fields¹⁵ as the amount of cleared land increased.

The average farmer of Lanark County in 1851 planted approximately 5 acres of wheat (Table 5.1) and the same in oats. The remainder of the cultivated land was divided among other crops with potatoes and peas having the highest output. The amount of acres planted in wheat (Table 5.1) is certainly not as high as in some areas of Southwestern Ontario where as much as one-half of the cleared land was occupied by this single crop.¹⁶ In contrast, however, the types of agriculture represented by the amount of acreage in Table 5.1, resembles a mixed type farming with a variety of crops and livestock.¹⁷ In the twenty years between 1851 and 1871 there was an increase in hay, wool and butter production in Lanark. Wool and butter had become important commodities which were exported to the United States. This outside market for agricultural products was very important to Lanark County since previously it had depended on the forest industry as its sole buyer. As late as 1853 there

PERCENTAGE OF FARMS ACCORDING TO THE TYPE OF CROP GROWN

FIGURE 5.8

Source: Calculated by the author from the P.A.C., Census Enumeration Returns for 1841, 1851/52, 1861 and 1871.

had been no worthwhile agricultural exports from the regions west of Bytown.¹⁸ If Lanark is again compared to York County (Table 5.3) in 1871, it is somewhat lacking in the number of livestock and amount of crops and farm products. Marr, in a study of York County's demographic and agricultural profile, compares tenant and owner farmers, establishing distinct differences between the two groups.¹⁹ Agriculturally, the York tenant or owner farmer either

TABLE 5.3		
York County Mean Output Per Farm for Farm Products and Number of Livestock		
Product	Tenant	Owner
Barley (Bsh)	227.5	240.8
Oats (Bsh)	212.1	259.5
Peas (Bsh)	105.8	117.9
Wool (lbs)	68.8	83.7
Butter (lbs)	245.7	300.2
Cheese (lbs)	259.4	188.0
Cattle	4.8	5.4
Cows (milk)	3.7	5.0
Horses (over 3 years)	2.9	3.3
Sheep	12.0	15.5
Hogs	6.8	7.8
Source: W.L. Marr, Tenant VS Owner Occupied Farms in York County, Ontario 1871.		

exceeded or matched Lanark's mean farm yields and average number of livestock. In the production of barley, oats, peas, wool and cheese, the agricultural output of the Lanark farmer was comparatively less than that of York County. In farm livestock the contrast between Lanark and York was relatively even with only a moderate difference in the number of hogs. The large Toronto market was certainly a contributing factor in encouraging York's high production of farm goods. Butter was the only product in which Lanark surpassed York and was a major export to the United States.

Average yields of bushels per acre for certain Lanark crops are compared to mean Ontario yields in Table 5.8. The table shows that crop yields for Lanark are lower overall in relation to the rest of Ontario. Reasons for the lower yields could be attributed to the lack of good soils in Lanark and poor farming methods which neglected manuring, fertilizers and rotation root crops.²¹

Spring and fall wheat yields of 15.6 and 17.4 bushels per acre for Lanark were available from the 1861 census. The larger yields and higher market price of fall wheat over spring²³ did not, however, make it a more popular crop, since it was highly susceptible to insects and rust and also winter-kill which was especially damaging in Lanark.²⁴ Quite often planted in fields which were

<p style="text-align: center;">TABLE 5.4</p> <p style="text-align: center;">1851/52 Crop Yields for Lanark County and the Province of Ontario in Bushels Per Acre (N = 271)</p>		
Crop	Lanark County (Bsh)	Province of Ontario (Bsh)
Wheat	12.6	16.2
Barley	18.7	20.9
Rye	10.9	12.3
Peas	11.8	14.3
Oats	22.7	26.6
Corn	17.7	24.1
<p>Source: Compiled by the author from the Published Census returns and P.A.C. Enumerations Returns for Lanark County 1851/52</p>		

sheltered from the winter winds,²⁵ fall wheat in 1861 was grown by 33.2 percent of the farm population, while the vast majority of 93.4 percent grew spring wheat. Sometimes farmers grew both crops, fall wheat to take advantage of its higher yields and price and spring wheat because of its durability.²⁶ The preference for spring wheat in Lanark is comparable with other regions of Ontario which were turning away from the less dependable fall wheat.²⁷

5.5 Summary

The agricultural land use patterns of Lanark County indicate that a majority of the predominant crop lands in 1871 were found near urban centres in the better agricultural lands. There was, however, one significant crop area located near a major lumbering region in the county, likely taking advantage of the nearby shanty market. The prevalent pasture lands of Lanark were found close to lumbering areas, probably a result of eager forest clearing settlers cutting timber to sell to the lumbermen. The physical association of crop and pasture land with specific soil types that was evident in 1871 was certainly not evident in 1851/52. In the earlier period, there was no association of farm types with the physical environment, an indication perhaps that farmers were not as well adjusted at this time as in 1871.

The most popular crops of the county between 1841 and 1871 were potatoes, oats and wheat, grown by over 80 percent of all the farmers. Wheat was not the most important crop in Lanark as it appears to have been in the rest of Ontario; in Lanark, in 1851, slightly more land was devoted to oats (5.2 acres to 5.0 acres) with output of 117.9 bushels of oats and 66.9 bushels of wheat per farm. Lanark

was the third major producer of butter in Ontario after York and Leeds, producing 674,927 pounds in 1851.²⁸ In the production of other livestock products and crops, however, Lanark's yields were relatively lower than the average for Ontario, which was available in the 1851/52 Census and shown on Table 5.4.

By 1871, over 50 percent of the farm land in Lanark had been cleared. Crops such as barley, peas and rye were having an increased output, while potatoes, corn, wheat and oats had decreased. Other agricultural products like wool and butter had also increased in 1871, mainly as a result of exports to the United States.

The types and amounts of crops and livestock products grown and produced in Lanark County would seem to indicate a mixed farming landscape in 1851/52, that probably did not exist in the rest of the province. In 1871, this mixed farming appears to be present in Lanark, but is now also becoming popular in the rest of Ontario.

The following chapters will examine statistically the types of farming that were found in the county and to what extent mixed farming was part of this agricultural landscape.

FOOTNOTES

1. P.A.C., Census of Canada for 1841/42, Enumeration Returns for the Bathurst District, Microfilm Reel C-1344. The 1841/42 Census of Lanark County, lacking the four townships of North Burgess, North Elmsley, Montague and Ramsay, which have not survived, were systematically sampled. A 9.4 percent sample consisting of 179 observations upon 11 variables is presented in Appendix A;

P.A.C., Census of Canada for 1851/52, Enumeration Returns for Canada West, Lanark County, Microfilm Reels C-11731 and C-11732;

P.A.C., Census of Canada for 1861, Enumeration Returns for Lanark County, Microfilm Reel C-1043. The 1861 Census of Lanark was complete. It was sampled by a systematic technique resulting in 380 observations upon 19 variables (Appendix A).

P.A.C., Census of Canada for 1871, Lanark County, North and South, Microfilm Reels C-10017, C-10018 and C-10019.
2. R.L. Jones, History of Agriculture in Ontario, 1613-1880, (Toronto, 1946), pp. 65-66.
3. W.L. Marr, "Tenant VS Owners: Occupied Farms in York County, Ontario 1871," in D.H. Akenson (ed.), Canadian Papers in Rural History, (Genanoque, 1984), p. 63.
4. C.G. Head, "Nineteenth Century Timbering and Sawlogging in the Ottawa Valley: Documentary Sources and Spatial Patterns" in V. Ivonoffski and S. Campbell (eds.), Exploring Our Heritage: The Ottawa Valley Experience, pp. 55-57.
5. W.T. Easterbrooke and H. Aitken, Canadian Economic History, (Toronto, 1958), p. 281.
6. R.L. Jones, Op. Cit., pp.138-139); in a recent seminar at Carleton University, Ottawa, Professor M. McInnis initiated a re-evaluation of the notion of Ontario agriculture as a wheat monoculture. See also D. McCalla, "The Internal Economy of Upper Canada: New Evidence on Agricultural Marketing Before 1850," Agricultural History, Vol. 59, No. 3 (1985), pp. 397-399.

7. M. McInnis, "The Changing Structure of Canadian Agriculture," 1867-1897, Journal of Economic History, XLII,1 (1982), pp. 194-195;
- J. McCallum, Unequal Beginnings: Agriculture and Economic Development in Quebec and Ontario Until 1870, (Toronto, 1980), pp. 45-53;
- K. Kelly, The Agricultural Geography of Simcoe County, 1820-1880, (unpublished PhD. dissertation, University of Toronto, 1968), pp. 5-8.
8. M. McInnis, Op. Cit., 1982, p. 194.
9. J. McCallum, Op. Cit., 1980, p. 48.
10. R.L. Jones, Op. Cit., 1946, p. 119.
11. R.L. Jones, Op. Cit., 1946, pp. 225-229.
12. P.A.C. Census of Canada 1870, Enumeration Returns for Lanark County, Microfilm No. C-10017, C-10018, C-10019. This Census did not provide acreage returns for all the crops and was therefore not included.
13. A.R.M. Lower, Great Britain's Woodyard: British North America and the Timber Trade, (Montreal, 1973), pp. 121-122;
- R.L. Jones, Op. Cit., 1946, pp. 206-207.
14. Canada Farmer, Vol. 1, No. 2, (Toronto, 1864), p. 18.
15. K. Kelly, "The Impact of Nineteenth Century Agricultural Settlement on the Land," in J.D. Wood (ed.), Perspectives on Landscape and Settlement in Nineteenth Century Ontario, No. 91, (Toronto, 1978), pp. 74-75.
16. K. Kelly, "Wheat Farming in Simcoe County in the Mid-Nineteenth Century," Canadian Geographer, XV, No. 2 (1971), p. 96.
17. K. Kelly, Op. Cit., 1968, p. 139.
18. R.L. Jones, Op. Cit., 1946, p. 112.
19. W.L. Marr, Op. Cit., 1984, pp. 50-71.
20. Ibid., pp. 66-67.

21. Canada Farmer, Op. Cit., 1864, p. 17;
Canada Farmer, Vol. 1, No. 20 and 21, (Toronto, 1864),
p. 306.
22. P.A.C., Census of Canada 1851/52, Canada West, Lanark
County, Microfilm Reels C-11731, C-11732.
23. K. Kelly, Op. Cit., 1971, p. 96.
24. Ontario Agricultural Commission Report, Vol. 2,
(Toronto, 1881), p. 340.
25. Ibid., p. 340.
26. Ibid.^{*}, p. 357.
27. Canada Farmer, Op. Cit., p. 34.
28. R.L. Jones, Op. Cit., 1946, p. 253.

CHAPTER SIX

DATA SAMPLING AND VARIABLES

CHAPTER SIX

THE 1851/52 AND 1871 DATA SAMPLING AND VARIABLES

6.1 Purpose

In past agricultural studies, there has been a great deal of attention focussed on land abandonment and marginal farming on the Canadian Shield.¹ There has been minimal examination of nineteenth century agriculture that existed in these marginal regions, which set the stage for conditions that prevail today. Even less common are studies of early Canadian agriculture using statistical methods of analysis, some of which will be applied in this thesis.

However, before discussing the application of some of the quantitative methods, an outline will be given of the sampling method, types of data and variables that will be used in this thesis for the years studied, that is, 1851 and 1871.

6.2 Problems and Method of Data Sampling

It is unfortunate that the Townships of Darling, Ramsay, three concessions of Lanark and part of Montague are missing from the 1851/52, Canada West Census of Lanark County.² This is not, however, the case in 1871, where the data are complete for all the townships. These data were sampled using a systematic sampling method, similar to what is prescribed by Berry and Marble³ as well as Hammond and McCullagh.⁴ To establish sample locations, it was decided to use lots and concessions, a method also employed by Norton and Conkling in their study of nineteenth century land use north of Toronto.⁵ In order to ensure continuity between the 1851/52 and 1871 data sets each sample was not only located by its lot and concession but also by the name of the head of house who resided at every sample location. The only discrepancy among the two data files was that the 1871 data had additional samples to the 1851/52 data set, either because of settlement in regions that were previously uninhabited, or because the data were not available in 1851/52. In total, 271 samples were extracted from the available townships of the 1851/52 census of Lanark County. This sample represented 12.8 percent of the overall number of farmers who were enumerated. The sample size for 1871, because of additional settlement and no missing

townships, was increased to 385 locations which represent 11.4 percent of the farmers.⁶

To enable sample plots of the agricultural land use patterns to be produced, each sample was given a grid reference.

Before the data were compiled from the 1851/52 census records into machine readable form, there was a need to be aware of some of the shortcomings that were inherent in the enumeration returns. Shortcomings in the Census of 1851/52 were identified early. The office of Registration and Statistics noted errors at the level of enumeration and compilation, remarks that found support in the statement of an individual enumerator, that the census was perceived as a vehicle of taxation rather than enumeration.⁸ Contemporary researchers, including Clarke and Brown⁹, along with McInnis¹⁰, remark on the characteristics and problems of working with estimates and not exact figures. With some shortcomings, this census is all that we have of this early period, and its value for research purposes is immensely important.

6.3 1851/52 Data and Source

The 1851/52 census of Upper and Lower Canada was the first comprehensive enumeration that gathered agricultural

information pertaining not only to yields but also crop acreage. As this thesis is a comparative study between 1851/52 and 1871, the choice of many of the variables was determined by their availability in both enumerations. The variables chosen were crops and livestock that would best represent Lanark County and the type of agriculture that prevailed. Some available information from the census such as the amount of flax, hemp, carrots, tobacco, mangle wurtzels, and a few others, were of minor importance in Lanark and therefore not compiled. The acreage of various crops along with their yields were included in the data set in order that crop yields could be calculated. The following (Table 6.1) is a list of the variables that were extracted from the 1851/52 census.

6.4 1871 Data and Source

The second of the data sets to be collected for Lanark County was from the 1871 Canada Census. As already mentioned, this census is complete for all of Lanark and has no missing townships. All the information available in 1851/52 was present in 1871 except for the acreage of all crops, for which only wheat and potatoes were recorded. Gathered information pertaining to agricultural schedules

TABLE 6.1

AGRICULTURAL VARIABLES OBTAINED FROM THE
CANADA CENSUS OF 1851/52,
LANARK COUNTY¹¹

Location Reference

1. Name of occupier
2. Concession or range
3. Lot or part of lot

Land

4. Acreage held by each person
5. Acreage under cultivation
6. Acreage under crops
7. Acreage under pasture
8. Acreage gardens or orchards
9. Acreage under wood or wild

Crops

10. Wheat in acres
11. Wheat in bushels
12. Barley in acres
13. Barley in bushels
14. Rye in acres
15. Rye in bushels
16. Peas in acres
17. Peas in bushels
18. Potatoes in acres
19. Potatoes in bushels
20. Oats in acres
21. Oats in bushels
22. Buckwheat in acres
23. Buckwheat in bushels
24. Indian corn in acres
25. Indian corn in bushels
26. Turnips in acres
27. Turnips in bushels
28. Hay in tons

Livestock

29. Number of bulls, oxen or steers
30. Number of milk cows
31. Number of calves or heifers
32. Number of horses of all ages
33. Number of sheep
34. Number of hogs

Animal Products

35. Butter in lbs
36. Cheese in lbs
37. Beef in cwts
38. Pork in cwts

TABLE 6.2

AGRICULTURAL VARIABLES OBTAINED FROM
THE CANADA CENSUS OF 1871
LANARK COUNTY¹²

Location Reference

1. Name of occupier
2. Range or concession
3. Number of lot

Land

4. Total number of acres occupied
5. Number of acres improved
6. Number of acres in pasture
7. Number of acres in gardens or orchards

Crops

8. Acres of wheat
9. Bushels of spring wheat
10. Bushels of fall wheat
11. Bushels of barley
12. Bushels of Oats
13. Bushels of Rye
14. Bushels of Peas
15. Bushels of Beans
16. Bushels of Buckwheat
17. Bushels of Corn
18. Acres of Potatoes
19. Bushels of Potatoes
20. Bushels of Turnips
21. Acres of Hay
22. Tons of Hay

Livestock

23. Number of horses over 3 years old
24. Number of colts and fillies
25. Number of work oxen
26. Number of milk cows
27. Number of other horned cattle
28. Number of sheep
29. Number of hogs

Animal Products

30. Number of cattle killed or sold for slaughter
31. Number of sheep killed or sold for slaughter
32. Number of hogs killed or sold for slaughter
33. Number of lbs. of butter
34. Number of lbs. of home-made cheese

Forest Products

- 35. Number of cubic feet white square pine
- 36. Number of cubic feet red square pine
- 37. Cubic feet of square oak
- 38. Cubic feet of squared or sided tamarac
- 39. Cubic feet of squared or sided birch and maple
- 40. Cubic feet of squared elm
- 41. Cubic feet of other squared or sided timber
- 42. Number of census standard pine logs
- 43. Number of census standard spruce and other logs

was basically similar to the 1851/52 enumeration returns with only slight variations in the method of classifying farm livestock.

A significant addition to the 1871 Census was the amount of square pine, square timber and various types of forest products cut by each person enumerated. Table 6.2 provides a list of variables contained within the 1871 data set.

6.5 Summary

A sample of data were drawn for each of two periods using systematic sampling procedures in order to examine changes in agriculture spatially and through time. For purpose of compatability, the same lots were retained in the study through both time periods, although new observations were allowed to be introduced in the second set to reflect the expansion of the agricultural system. The data were grid-referenced for mapping purposes.

FOOTNOTES

1. J.H.B. Richards, "Agricultural Patterns in the Precambrian Area of Southern Ontario," Canadian Geographer, 1 (1955), pp. 63-70; E.B. MacDougall, "An Analysis of Recent Changes on the Number of Farms in the Northern part of Central Ontario," Canadian Geographer, 14, No. 2 (1970), pp. 125-138; H.E. Parsons, "An Analysis of Farmland Abandonment Trends; A Study of Central Ontario," Ontario Geographer, 14 (1979), pp. 41-57.
2. P.A.C., Census of Canada, 1851/52, Canada West, Lanark County, Microfilm Reels, C-11731, C-11732.
3. B.J.L. Berry and D.F. Marble, Spatial Analysis: A Reader in Statistical Geography, (Englewood Cliff, 1968), p. 93.
4. R. Hammond and P. McCullagh, Quantitative Techniques in Geography: An Introduction, (Oxford, 1978), pp. 136-137.
5. W. Norton and E.C. Conkling, Land Use Theory and the Pioneering Economy, Geografiska Annaler, 56, B (1974), p. 48.
6. P.A.C., Census of Canada, 1870/71, vol. III, Table XXI, Lanark County, pp. 88-89.
7. SYMAP, Synagraphic Computer Mapping, Version V, Reference Manual, adapted for Xerox Computers, Carleton University, (Ottawa, 1969).
8. P.A.C., Census of Canada, 1851/52, Remarks by the enumerator, Township of Drummond, Microfilm Reel, C-11732, p. 77.
9. J. Clarke and D.L. Brown, "Foci of Human Activity, Essex County, Ontario, 1851/52: Archival Sources and Research Strategies," Archivaria, 12(1981), pp. 31-57.
10. R.M. McInnis, "Some Pitfalls in the 1851/52 Census of Agriculture of Lower Canada," Social History, XIV, No. 27 (1981), pp. 219-311.

11. P.A.C., Census of Canada, 1851/52, Canada West, Lanark County, Microfilm Reels C-11731, C-11732.
12. P.A.C., Census of Canada, 1871, Lanark County North and South, Microfilm Reels C-10017, C-10018, C-10019.

CHAPTER SEVEN

MAJOR TYPES OF AGRICULTURE

CHAPTER SEVEN

MAJOR TYPES OF AGRICULTURE

7.1 Purpose

The primary purpose of this chapter is to identify the major types of agriculture in Lanark in 1851/52 and 1871, and to describe the spatial patterns of agriculture at this time. Principal components analysis is used to this end. The secondary purpose of the chapter is to determine if it is possible to identify, in both periods, farms, which in emphasis fit the models outlined by Lower.

Principal components analyses were performed on a series of logarithmically transformed variables to reduce complexity and to obtain a reduced number of meaningful, statistically independent components for 1851/52 and 1871 that could meet the requirements of multiple regression, employed in the subsequent Chapter.¹ Logarithmic transformation was necessary since many of the independent variables had skewed distributions (Appendix B). The results of these two such analyses for 1851 and 1871 respectively are presented and discussed below.

7.2 1851/52 Principal Components Analysis

The principal components analysis of the 1851/52 data established five principal components, whose eigenvalues were greater than one. All the components are shown on Table 7.1. The first component accounted for 33.7 percent of the variance and the second component an additional 7.1 percent. The next three significant components contributed 5.9, 5.6 and 5.0 percent to the variance. In total, the five components accounted for 57.3 percent of the variance.

7.3 Component I - Livestock/Mixed Farming

The first component had high loadings among the livestock variables and a few produce variables such as butter (X_{18}), pork (X_{21}) and wool (X_{11}). Primarily a livestock component, moderate values were also associated with crops of oats (X_6), potatoes (X_7), wheat (X_2), and peas (X_5), as well as hay (X_{10}). The first four crops indicated a 'rotation' type of farming, in which fields of wheat and oats were alternated with peas and potatoes.² This method of crop rotation, along with the application of manure, which was available if livestock were present, was considered the most scientific method of farming at this time.³ Crop rotation was already present on the farms of

TABLE 7.1 -

Principal Components1851/52 Analysis

Component	Eigenvalue	Percentage of Variance	Cumulative Percentage
1	7.08	33.7	33.7
2	1.48	7.1	40.8
3	1.24	5.9	46.7
4	1.18	5.6	52.3
5	1.04	5.0	57.3
6	.96	4.6	61.9
7	.87	4.1	66.0
8	.81	3.9	69.9
9	.78	3.7	73.6
10	.72	3.4	77.0
11	.70	3.3	80.4
12	.63	3.0	83.4
13	.57	2.7	86.1
14	.54	2.6	88.7
15	.50	2.4	91.1
16	.42	2.0	93.1
17	.39	1.8	94.9
18	.34	1.6	96.5
19	.33	1.6	98.1
20	.24	1.2	99.3
21	.15	.7	100.0

Source: Calculated by the author from the 1851/52 Canada Census, Lanark County

TABLE 7.2
1851/52 Principal Components

	Component I Livestock/Mixed	Component II Mixed Farming/ Lumbering	Component III Crop/Grain	Component IV Cheese	Component V Oxen/Cattle	Community
Garden (X ₁)	.0566	.3021	-.0561	-.0367	.0029	.0989
Wheat (X ₂)	.4276	.3478	.1770	.1082	.0264	.3475
Barley (X ₃)	.1579	.3141	.0064	.2764	.0397	.2016
Rye (X ₄)	-.0092	-.0523	.4742	.0035	-.0903	.2358
Peas (X ₅)	.3586	.2934	.2988	.2944	-.1192	.4048
Oats (X ₆)	.5098	.3672	.3263	.0739	.0443	.5086
Potatoes (X ₇)	.4460	.0709	.3836	.0505	.0674	.3582
Turnips (X ₈)	.0547	.0109	.3289	.0591	.0329	.1159
Corn (X ₉)	.1325	.0277	.4193	.0708	.1357	.2176
Hay (X ₁₀)	.5608	.4199	.2341	.1254	.2364	.6173
Wool (X ₁₁)	.5317	.3994	.3161	.2175	.2927	.6751
Oxen & Steers (X ₁₂)	.0383	.0248	.0368	.0764	.5665	.3301
Milk Cows (X ₁₃)	.7809	.2331	.0548	.2795	.0561	.7485
Calves (X ₁₄)	.6418	.2131	.0855	.1153	.0075	.4779
Horses (X ₁₅)	.5934	.3740	-.0338	.0808	-.1902	.5358
Sheep (X ₁₆)	.6361	.3395	.1945	.2386	.2305	.6677
Hogs (X ₁₇)	.6794	.2235	.1467	.1161	-.1625	.5729
Butter (X ₁₈)	.8142	-.1116	-.0042	.1757	.1972	.7451
Cheese (X ₁₉)	.1401	-.0279	.1574	.6367	.1168	.4643
Beef (X ₂₀)	.3557	.1588	.0164	.0017	.0398	.1536
Pork (X ₂₁)	.7124	-.0774	.2704	-.0078	.0602	.5903

Source: Calculated by the author from the 1851/52 Canada Census, Lanark County.

Lanark in 1841. A variety of crops was raised, rather than a monoculture practised. (Appendix D).

The first component represents a mixed farming landscape in which there was an emphasis on the rearing of livestock, especially milk cows for the production of butter. These results compare favourably with known patterns of agriculture in some of the more established counties along the Lake Front of Ontario, where, by 1850, specialized dairy farming was undertaken.⁴ In the Lanark case the interpretation of this first component as the livestock emphasis component is supported by the fact that in 1851, 96 percent of Lanark farmers possessed an average of about 4 milk cows each, from which an average of 236 pounds of butter per farmstead was produced per farmstead.⁵

The people whom this component represents also participated in the raising of hogs (X₁₇) and the production of pork (X₂₁) which was found on 89 percent of Lanark farms. Other livestock such as sheep (X₁₆) and horses (X₁₅) were also important. There were 36,000 sheep and 5,500 horses bred in the County in 1851/52.⁶

Apart from the farm animals, the most important crops grown were hay (X₁₀) and oats (X₆). It would appear that these two crops were used primarily as feed, considering the number of livestock raised by this type of farmer.

The areas of Lanark where this kind of mixed agriculture was prevalent can be seen in the plot of component scores (Figure 7.1). The most significant regions are located in the more established townships of Bathurst, Drummond and Beckwith. If data had also been available for the township of Ramsey, this type of livestock - mixed farming would probably have been found there as well. Located in the more fertile eastern regions of Lanark County (Figure 2.4), this type of agriculture very clearly resembles the description by Lower of an agriculture practised by an 'established farmer', a farmer who probably had sufficient cultivated land to raise a variety of livestock and crops, support himself entirely from farming and had surplus products to sell at local markets or to shanties.

7.4 Component II - Mixed Farming/Lumbering

Component II was associated with a large number of low to moderate loadings on both the livestock and crop variables. This second component is another version of mixed farming, concentrating on a variety of agricultural crops and animals, with no tendency towards specialization. Except for wool (X_{11}), the production of farm goods

Distribution of Livestock/Mixed Farming
Component Scores for 1851/52

Figure 7.1

Source: Compiled by Author

such as butter (X₁₈), cheese (X₁₉), beef (X₂₀) and pork (X₂₁) is relatively insignificant in this type of agriculture in comparison to Component I. Hay (X₁₀) has the highest coefficient in this component, perhaps indicating that it could have been a cash crop that was sold to the lumber shanties.

Apart from hay and wool the most noteworthy crop was again oats (X₆), while the most noticeable livestock were horses (X₁₅). A plot of the component scores (Figure 7.2) displayed some high concentrations of this type of agriculture near the Town of Pakenham, on the Mississippi River, and Port Elmsley on the Rideau River. These component scores are possibly situated where they are because of the proximity of the river (Figure 2.3) for transportation and possibly also because of their nearness to markets - Pakenham and Port Elmsley. There was also a large concentration in the least settled region of Lanark - Lavant Township.

The location of farms near the towns of Pakenham and Port Elmsley on the Mississippi and Rideau Rivers, perhaps represent the 'farmer-lumberman' who was likely transporting, by horse, cut lumber to the local sawmills in the towns, or to the rivers for shipment to more distant markets.

Lavant Township may have seen the timber harvester or teamster of Lower, although there is no absolute certainty of this. However, the component scores emphasize horses which may have been used in these poorly endowed areas to pull timber from the logging camps.

7.5 Component III - Crop/Grain Farming

This component consists entirely of crop variables with very little representation of livestock except perhaps for pork (X_{21}). Crops such as rye (X_4) and corn (X_9), which have been insignificant to this point, have now surfaced in association with oats (X_6), potatoes (X_7), turnips (X_8), peas (X_5) and hay (X_{10}). An interpretation of this factor partially parallels Kelly's description of a feed type farming in Simcoe County, where similar crops and minimal livestock were raised. Crops grown in this type of farming were usually sold in the fall and, without the burden of farm animals to care for, the farmer was able to find temporary employment in the lumber camps during the winter.⁷ In Kelly's example, however, wheat was substituted for rye and corn, because in most of Southwestern Ontario, wheat was a very marketable crop and therefore grown in significant amounts on most farms. Kelly's feed-type farmer grew wheat with the same types of crops that were found in

Distribution of Mixed Farming/Lumbering
Component Scores for 1851/52

Figure 7.2

Source: Compiled by Author

Component III, such as oats, potatoes, hay and also raised only a small amount of livestock. While this third Lanark component does include wheat, the emphasis is upon rye and corn. It is mainly in the crops of oats, potatoes, peas and hay that it resembles Kelly's model. Wheat in Lanark was obviously not as important at this time as in other areas of Southern Ontario on which Kelly based his interpretation. Another factor which may in part account for this is the more extreme climatic conditions that exist in Eastern Ontario.

Figure 7.3 shows that this type of farming was located primarily in the townships of Lanark, Dalhousie and the northern fringes of Drummond and Beckwith. This area of rye, corn and feed farming was centrally located, situated on relatively poor agricultural land (Figure 2.4). The growing of these crops may indicate an agricultural adjustment to poorer lands.

7.6 Component IV - Cheese Making

Components IV and V were different from the above in that each had one distinct and prominent loading. The coefficient cheese (X_{19}) stood out in this fourth component, indicating a specialization in that product (Table 7.2).

Distribution of Crop/Grain Farming
Component Scores for 1851/52

Figure 7.3

Source: Compiled by Author

There was also a slight presence of some milk cows (X_{13}), sheep (X_{16}) and wool (X_{11}). The few crops that were grown, such as barley (X_3) and peas (X_5) were probably used as feed for the milk cows.⁸

This type of farmer was found in concentrations (Figure 7.4) from the agriculturally poor areas of North Sherbrooke, Dalhousie and Lanark to the slightly better lands of Drummond and Beckwith Townships (Figure 2.4). Obviously cheese could be produced on rich and poor arable land. Given the structure of the factor loadings, this component is interpreted in the Lanark case as indicating a subsistence type farmer. Cattle can be grazed easily on the wildest land and in an age lacking refrigeration, cheese provided a cash return that could be used in further developing the land above the subsistence stage. Representing a subsistence type of farming, this Lanark settler might have been anything from a 'new or poor farmer' to a 'shanty farmer' or even a 'squatter'. These farmers were limited in their agricultural output, except for cheese. In the particular circumstance of Lanark County they probably supplemented their income as lumberjacks.

Distribution of Cheese Farming
Component Scores for 1851/52

Figure 7.4

Source: Compiled by Author

7.7 Component V - Oxen/Cattle Farming

Component V scores representing oxen or steer (X_{12}) farmsteads, are primarily located (Figure 7.5) in South Sherbrooke, a township that was described as better suited to lumbering than farming.⁹ In newly settled areas and recently deforested areas, oxen were preferred as draught animals since their ability to manoeuvre patiently through stump-laden fields was an advantage over the less-manageable horse.¹⁰

If large areas of forests were being cut and cleared, this provided room for grazing animals such as sheep (X_{16}) and steers (X_{12}) which were present in this component. The sheep would supply wool (X_{11}), and were an important source of clothing, while steers could be sold as beef (X_{10}). However, there was a lack of slaughtered beef in this component indicating that the steers were possibly sold live rather than slaughtered. Another possibility for the lack of beef was that the oxen rather than steers were the most significant livestock in this oxen/steer component, and, as was explained in Chapter VI, the only reason both were present is that they were enumerated as "livestock" in the 1851/52 Census.¹¹

Distribution of Oxen/Cattle Farming
Component Scores for 1851/52

Figure 7.5

Source: Compiled by Author

A negative inverse loading on horses (X₁₅) adds support to the presence of oxen, since both livestock were usually not found together on the same farm. Grain crops were significantly absent from Component V; only hay (X₁₀) appeared and this could easily grow between the stumps of the cleared forests.

This may also indicate a settler who was engaged more in the cutting and hauling of lumber by oxen than in farming. Doing only a minimum of farming, this person could be a 'squatter' who was supporting himself primarily by working in the lumber camps. Another possibility was that this type of settler, with no intention of farming, was a 'timber harvester', cutting timber and selling to the lumbermen. If this individual was located close to a settlement, such as many near the town of Lanark (Figure 7.5), the cut logs could then be sold directly to a sawmill rather than indirectly to lumber merchants.¹²

7.8 Overall Interpretation of the 1851/52 Components

The above five components represent the major types of agriculture that existed in mid nineteenth century Lanark. The types of agriculture range in emphasis from a specialized livestock-mixed farming to crop farming, to a kind of subsistence agriculturist who was probably more of a

lumberman than a farmer. Every type of farmer from 'established farmer', to 'farmer-lumberman', to 'squatter' was likely represented by the five major kinds of agriculture. However, the first two components, representing mixed farming components, were the most significant as Table 7.1 shows. There was a mutual relation between the soil regions in which these types of agriculture existed and the level of agricultural production. This development placed more intensive production, such as Livestock/Mixed farming on the better soils of Lanark and the marginal Oxen/Cattle farming on the poor soils of the Canadian Shield (Figure 2.4).

As different as the types of farming may appear, there was a thread of similarity between all of them. Hay (X_{10}), sheep (X_{16}) and wool (X_{16}) were consistently found in all components. It seems that no matter what type of agriculture was practised in Lanark, these three commodities were an essential part of farming in 1851/52.

The statistical association between sheep and wool is understandable since wool could not be produced without the presence of sheep. Where sheep are present, hay will also appear since it was a major winter feed in Lanark.¹³ Wool was important to the settler for the manufacture of clothing and blankets. In early Ontario, such products were not produced in factories but on the farm.¹⁴ The presence of

sheep and wool in Lanark in 1851 was quite marked and would eventually result in the industrial development of the area as a woollen manufacturing region.¹⁵

7.9 1871 Principal Components Analysis

The 1871 data set was designed to be compatible with the 1851/52 data set (Chapter Six). Except for the variables wheat and oxen, all other variables in 1871 were identical to those of 1851/52. Wheat (X_2) in 1851/52 was recorded as a single variable, while in 1871 it was divided into spring wheat (X_2) and fall wheat (X_3).

In 1851/52, the census enumerators included steer and oxen as one category. The 1871 Census, however, distinguished between oxen (X_{13}) and steers (X_{15}); each was therefore included in the data set separately.

A principal components analysis of the twenty-two variables for the 1871 data also produced five principal components with eigenvalues of 1 and greater. The first component, shown on Table 7.3, accounted for 33.4 percent of the variance; the second component represented an additional 7.9 percent. The variance on the remaining three principal components was 6.4 percent, 5.8 percent and 4.9 percent. The individual variances for 1851/52 were very similar in value to the individual 1871 variances

(Table 7.1). The five components for 1871 in total represented 58.4 percent of the overall variation, which is only 1.1 percent greater than the overall 1851/52 variance of 57.3 percent. The similarities indicates a structural similarity between the two time periods.

7.10 Component I - Livestock Farming

The first component had a number of high to medium loadings associated with livestock variables and products. The most significant farm animals were sheep (X_{16}) and milk cows (X_{14}); hogs (X_{17}), steers (X_{15}) and horses (X_{12}) were also important. The kinds of farm products associated with this type of agriculture are indicated by the high loadings on wool (X_{22}), butter (X_{19}) and pork (X_{20}) (Table 7.4). Spring wheat (X_2) was the only crop in this component that was of any importance, while the remaining variables were of minor consequence. This first component was labelled the Livestock component.

Similar to Component I of 1851/52, it shows even stronger reliance upon the raising of farm animals and animal products and a decreased stress upon the growing of crops. Component I in 1871 represents a specialized livestock-type of farming that had evolved even further than Component I of 1851/52. The high coefficient for butter

TABLE 7.3
Principal Components
1871 Analysis

Component	Eigenvalue	Percentage of Variance	Cumulative Percentage
1	7.36	33.4	33.4
2	1.73	7.9	41.3
3	1.41	6.4	47.7
4	1.27	5.8	53.5
5	1.07	4.9	58.4
6	.95	4.3	62.7
7	.90	4.1	66.8
8	.88	4.0	70.8
9	.86	3.9	74.7
10	.76	3.4	78.2
11	.67	3.1	81.2
12	.64	2.9	84.1
13	.56	2.6	86.7
14	.49	2.3	89.0
15	.43	2.0	90.9
16	.42	1.9	92.9
17	.38	1.7	94.6
18	.34	1.6	96.1
19	.31	1.4	97.6
20	.28	1.3	98.8
21	.14	.6	99.5
22	.12	.5	100.0

Source: Calculated by the author from the 1871 Census of
Canada, Lanark County

TABLE 7.4
1871 Principal Components

	Component I Livestock	Component II Mixed Oat Farming/ Wheat Emphasis	Component III Cheese	Component IV Cattle	Component V Forest/ Fall Wheat	Communality
Garden (x_1)	-.0615	-.0624	-.1198	.0625	.3771	.1682
Spring Wheat (x_2)	.3393	.7233	.0936	.1171	-.0647	.6649
Fall Wheat (x_3)	.1453	.0733	.1575	-.0449	.4583	.2633
Barley (x_4)	.1092	.2998	-.1681	.0515	.0776	.1387
Oats (x_5)	.1952	.7294	.1968	.0502	.0707	.6163
Rye (x_6)	.0452	.1068	.0692	.0674	.1856	.0572
Peas (x_7)	.1466	.5740	.1193	.0623	-.0301	.3699
Corn (x_8)	.0719	.1203	.1644	.0320	.1365	.0663
Potatoes (x_9)	.2225	.5129	.2651	.0178	.1990	.4228
Turnips (x_{10})	.1066	.1059	.3887	.1247	.0312	.1902
Hay (x_{11})	.2111	.5765	.2489	.2929	.0922	.5332
Horses (x_{12})	.5326	.3857	.0803	.2469	.0024	.4998
Oxen (x_{13})	.0355	-.2215	.1566	-.0294	.2059	.1181
Cows (x_{14})	.7893	.3396	.1505	.1254	.1906	.8131
Steers (x_{15})	.5544	.3281	.2179	.5026	.1789	.7471
Sheep (x_{16})	.8393	.1951	.2226	.0379	-.0471	.7958
Hogs (x_{17})	.6871	.3172	-.0636	.2079	.2251	.5813
Beef (x_{18})	.3155	.1947	.1774	.4692	.1041	.3998
Butter (x_{19})	.8586	.0599	.0886	.1047	.0936	.7683
Pork (x_{20})	.5622	.4370	.0479	.1050	.1558	.5446
Cheese (x_{21})	.1198	.0516	.5873	.0247	.0423	.3643
Wool (x_{22})	.8443	.1406	.2604	.0747	-.0448	.8031

Source: Calculated by the author from the 1871 Census of Canada, Lanark County.

(X₁₉) for 1871 was related to the large amount that was produced in Lanark, the total of which was 1,109,696 pounds in comparison to 674,927 pounds in 1851/52.¹⁶ The large amounts of butter substantiates the idea that dairying was emerging from the more general livestock emphasis developed between 1851 and 1871. It is likely that butter had increased in importance during this period as a result of the 1854 Reciprocity Treaty with the United States which had opened American markets to Ontario and Quebec exports.¹⁷

The component scores (Figure 7.6) show some moderate concentrations of this type of agriculture in Pakenham, Bathurst and Drummond Townships. The concentrations are more disparate and less extensive than the Livestock/Mixed Farming of 1851/52 (Figure 7.1). The distribution of livestock farming in 1871 was more scattered than in 1851/52, but it was located on the slightly better soils of Lanark (Figure 2.4), especially in Pakenham Township.

The type of farmer that participated in this kind of agriculture was probably still the 'established farmer', who, in 1851/52, had possessed a range of livestock and who, by 1871, was beginning to specialize in milk cows and sheep because of an outside market for butter and wool.

Distribution of Livestock Farming
Component Scores for 1871

Figure 7.6

Source: Compiled by Author

7.11 Component II - Mixed Farming, Oat/Spring Wheat Emphasis

Crops were the most significant variables of component II, while livestock and their products were of less importance. Oats (X_5) and spring wheat (X_2) were the predominant crops, while peas (X_7), potatoes (X_9) and hay (X_{11}) were also grown extensively. Livestock and farm products, such as horses (X_{12}), milk cows (X_{14}), steers (X_{15}), hogs (X_{17}) and pork (X_{20}) made a weak appearance and were not as strongly associated with this component as the crop variables.

This component represents mixed farming where areas of pasture provided hay and grazing land for livestock. As Kelly noted, fields of oats and wheat were usually rotated with crops of peas and potatoes on an annual basis.¹⁸

Figure 7.7 locates this oat/wheat agriculture primarily in Beckwith Township, with smaller concentrations in Pakenham, Ramsay, Montague, Drummond, North Burgess and Bathurst Townships. Some of these concentrations were situated on good agricultural land, such as those in Montague, Ramsay and Pakenham (Figure 2.4). These farms on the good soils were taking advantage of their situation and growing marketable crops such as oats and wheat.

However, the major concentration of this farm type in Beckwith Township was found extensively on Class 6 and Organic soils (Figure 2.4). Presumably, these settlers located in this township not because of the quality of the soils, but rather because of the presence of lumbering in the region (Figure 4.4). The advantage of a close market in the lumber shanties of this area was possibly a greater factor in encouraging the development of this type of agriculture, rather than the quality of the soil (Figure 2.4).

Oriented to the lumber market, this type of mixed oat/wheat agriculturist was probably very similar to Lower's 'shanty farmer.' This individual was taking advantage of the nearby lumber market, by producing and selling oats, wheat, pork and hay to the logging camps. All four products were in demand, oats and hay as feed for horses and other working livestock, while pork and wheat (ground to flour) was needed for consumption by the lumbermen.

7.12 Component III - Cheese Making

Component III had one significant loading - that of cheese (X_{21}), which was similar to the high loading found for cheese in Component IV of the 1851/52 data set. It appears that the production of cheese, as a farm industry, was present in 1851/52 and had remained significant in

Distribution of Mixed Farming, Oat/Spring Wheat Emphasis
Component Scores for 1871

Figure 7.7

Source: Compiled by Author

1871. Turnips (X_{10}) were the main crop in this component and were probably used as feed for cattle and sheep over the winter.¹⁹

This type of farmer had not changed significantly in the twenty years from 1851/52 to 1871 in relation to his level of agricultural production. It was still a subsistence agriculture with limited crops and livestock (Table 7.4).

Even the location of these types of farmers in 1871 was, in many cases, similar to the location of the farms in 1851/52. There were concentrations of cheese farming in North Sherbrooke, Dalhousie and Lanark Townships (Figure 7.8), which were in very similar locations to those shown on the 1851/52 plot (Figure 7.4).

The kind of farmer engaged in this type of husbandry was probably the same as that found in 1851/52. The farmers were anything from a 'poor farmer' to a 'shanty farmer' or a 'squatter' existing on predominantly poor lands of the Canadian Shield. Some of these settlers, however, were found on the better soils of Ramsay Township.

The cheese produced in some of the areas were probably sold to the lumber camps, since some of the farms, especially those located in Darling and Lanark Townships, were very close to lumbering regions (Figure 4.2). Cheese was relatively easily produced and provided a source of revenue so important in the early years of settlement.

Distribution of Cheese Farming
Component Scores for 1871

Figure 7.8

Source: Compiled by Author

7.13 Component IV - Cattle Farming

Component IV describes a steer (X_{15}) and beef (X_{18}) producing farm, with a slight presence of hay (X_{11}) and horses (X_{12}) (Table 7.4). This type of farm specialized in beef cattle while growing virtually no crops and raising very few other livestock.

These cattle producers, in some cases, were located close to lumbering regions, probably their main market. The major concentrations of this type of farming were located in northwest Darling Township, near White Lake (Figure 7.9), adjacent to a major pine lumbering area of Lanark County that had been identified previously on Figure 4.2 and compiled from the 1871 census. These pine lumbering areas were also evident in Figure 7.10 showing the white pine harvest, of 1866/67 and 1878/79.²⁰

Another cattle area was situated in North Elmsley Township, just outside of Smiths Falls in Montague Township. These cattle farmers were probably taking advantage of the town as a market, or were possibly shipping their cattle to the lucrative American market by way of the Rideau Canal system.³ Additional areas of cattle farming were found in North Burgess, Bathurst and North Sherbrooke

Distribution of Cattle Farming
Component Scores for 1871

Figure 7.9

Source: Compiled by Author

White Pine Harvest for Lanark County and Vicinity

(1866-67)

- 200 pieces squared timber

- 1000 saw logs

(1878-79)

- 200 pieces squared timber

- 1000 saw logs

Figure 7.10

Source: C.G. Head, Nineteenth Century Timbering
and Sawlogging in the Ottawa Valley

Townships. Some of these concentrations were located next to major rivers such as the Rideau, Mississippi and Fall (Figure 2.3).

Being situated close to rivers allowed these settlers to use them as a means of transporting logs that were possibly harvested by these 'forest farmers' or 'timber harvesters.' These farmers probably spent more time cutting timber than farming, which accounts for the non-existent crops and few livestock. Beef cattle were ideal for this type of farmer who allowed them to roam unattended in the newly cleared forests.²¹

7.14 Component V - Forest/Fall Wheat Farming

The fifth and last component had fall wheat (X_3) as the most significant loading with gardens (X_1) also making a noticeable appearance. These two variables had not been previously significant in any of the components.

In Chapter Three, fall wheat was described as being planted in sheltered areas, protected from the winter winds. A forest or stand of trees was used as a wind break to reduce the damaging effect of winterkill. A healthy fall wheat crop would therefore greatly depend upon the amount of shelter that was present and surrounding a field. Fall wheat was the most predominant variable in

Distribution of Forest/Fall Wheat Farming
Component Scores for 1871

Figure 7.11

Source: Compiled by Author

Component V, and knowing the requirements for a successful crop, we can assume that there was an adequate amount of forest cover still existing in the surrounding area to encourage the growth of this type of wheat.

Figure 7.11, locates the major concentrations of the forest wheat farmer near areas of known lumbering (Figures 4.2 to 4.5 and 7.10) in Darling, Lavant, Drummond, Montague, Dalhousie and North Burgess Townships. The forests in these regions would provide the needed shelter to protect the fall wheat in winter.

Forests, for most of the nineteenth century, were viewed as a hindrance to development by settlers who indiscriminately cleared them. It was not until the latter part of the century that the attitudes of farmers changed towards the forest, acknowledging its presence as necessary in the prevention of soil erosion, runoff and in the case of Lanark, providing shelter from winter winds.²²

Most of the forest wheat farmers were located on the poor soils of the Canadian Shield (Figure 2.4). These soils provided moderate crop yields for only a short period of time, before they became exhausted.

The type of settler associated with this Forest Wheat Farming was probably either a 'shanty farmer', a 'squatter' or a 'new/poor farmer.' In addition, oxen (X₁₃) were

linked to this component, which could make some of the farmers 'teamsters' as well. This farmer was found near lumber camps and grew wheat and garden crops in summer to sell to the shanties and probably worked as a lumberjack or teamster in winter.

7.15 Overall Interpretation of the 1871 Component

As in 1851/52 components, there was one dominant type of established agriculture in 1871, which resembled a mixed dairy and sheep farming. All the remaining components represented a moderate or subsistence type of agriculture where the farmers were probably engaged in lumbering.

There are no crops, livestock or products that are consistently present in all the components. However, milk cows and cattle were present in all five components, indicating perhaps the importance of these two livestock in 1871 Lanark agriculture.

7.16 Summary of the Structure of Agriculture, 1851-71

The first two components of each period represented the most general types of farming in the county and identified a kind of mixed agriculture, emphasizing crops or livestock rather than a balance of both. A dairy industry emerging

between 1851 and 1871 accounted for the large production of butter and smaller-scale cheese manufacturing in Lanark.

In 1851/52 a specialized grain farmer emerged, emphasizing rye and corn, and raising virtually no livestock. This individual was transformed by 1871 into a crop-oriented farmer growing mainly oats and wheat. The raising of beef cattle had, by 1871, become a specialty of the livestock farmer, probably in order to meet the demands of the forestry sector and the American market for beef products.

One type of farmer was present in both 1851/52 and 1871; the cheese maker who found a niche in the agricultural structure of Lanark and changed very little over the twenty years.

7.17 The Spatial Pattern of Agriculture

Figures 7.12 and 7.13 summarize the spatial patterns of components I to V for both 1851/52 and 1871. These two figures were constructed from the various individual component maps in this chapter that were originally produced by plotting component scores. Figures 7.14, 7.15 and 7.16 were constructed, using a variety of secondary sources, to show the relationship between agriculture and accessibility.²³

Major Agricultural Regions of Lanark County, 1851/52

Figure 7.12

Source: Compiled by Author

Major Agricultural Regions of Lanark County, 1871

Figure 7.13

Source: Compiled by Author

The Livestock/Mixed farms of 1851/52 (Figure 7.12) were scattered on the better quality soils around the Town of Perth in Bathurst and Drummond Townships and stretched into Beckwith Township. In this period, a large region of Mixed Farming/Lumbering, Crop/Grain and Cheese farms stretched across the centre of the county and joined with the Oxen/Cattle farming in southwestern Lanark, predominantly in South Sherbrooke Township. Most of this region is located on organic and poor soils, classes 6,7; however, there are Crop/Grain farms, located in central and eastern Lanark County that are situated on Class 2 soils. This distinct agricultural region does not follow the road pattern of the county as portrayed on Figure 7.14. The roads, during this period, generally ran in a north-south direction, connecting the towns of Perth, Lanark, Carleton Place, Almonte and Pakenham. In contrast, the agricultural region stretched in an east-west direction, across central Lanark and then changed to a north-south direction in the western portion of the county. A noteworthy feature of this region is that it crosses the major rivers of Lanark County (Figure 2.3) such as the Clyde, Mississippi, Fall and Tay.

Located between the scattered Livestock/Mixed farming and the more concentrated Mixed Farming/Lumbering, Crop/Grain, Cheese and Oxen/Cattle regions was an area not

dominated by a particular type of farming. This region, acting as a transition zone between the two distinct agricultural areas, was located where the Clyde, Mississippi and Fall Rivers joined.

If Component I reflects the established farmer he was one who relied upon a livestock and crop admixture for his income. The other remaining farmers, especially the Oxen/Cattle and Mixed Farming/Lumbering type probably relied heavily on the forestry sector for income. He sold agricultural produce to the shanties and worked extensively as a lumberjack. As already mentioned, the agricultural region of Mixed Farming/Lumbering, Crop/Grain, Cheese and Oxen/Cattle farming extended across the major rivers of Lanark in central and western sections of the County.

The pattern of agricultural regions displayed on Figure 7.13 identifies distinct clusters of farm types. The livestock farmer was found in scattered pockets located generally north of the Town of Perth, in Drummond Township. From here this type of farming extended through the centre of the county into Lanark Township and ended in Pakenham Township. Mixed farming emphasizing oats and spring wheat was found in the eastern half of the county away from the Canadian Shield. In contrast to the above, and located on the Shield, were two large clusters of Cheese, Cattle and

Roads of Lanark County, 1850

Figure 7.14

Source: PAC, G.F. Rottenburg, Map of the
Principal Communications in Canada West

Roads of Lanark County, 1863

Figure 7.15

Source: PAC, H.F. Walling, Map of the
Counties of Lanark and Renfrew

Forest/Fall Wheat farming. One of these clusters was situated southeast of White Lake, covering most of Darling Township. The second large cluster began in central Dalhousie Township and extended into North Sherbrooke Township. The cluster in Darling Township was adjacent to a pine lumbering region that has been identified by Head (Figure 7.10) and shown on Figure 4.2. The second cluster in Dalhousie and North Sherbrooke Townships, which straddled the Mississippi River was also quite near a pine lumbering area identified by Head (Figure 7.10). A third, smaller cluster consisting of Forest/Fall Wheat was located in the South of Lanark in North Burgess Township, beside the Rideau River. This cluster was also on the Canadian Shield, in an area that was probably being cut for timber, other than pine, for the American market (partially identified by the 1871 census data of the amount of timber cut by farmers (Figure 4.5).

The three clusters of farmers likely sold their agricultural produce to the logging camps and probably worked as lumberjacks. There is considerable agreement between the location of these clusters and the locations of timber cutting in Lanark as evident on Figures 4.2, 4.5 and 7.10.

Neither in 1851/52, nor in 1871, was there any relationship between accessibility, via the road network, and the sequence of these agricultural zones.

Roads of Lanark County, 1880

Figure 7.16

Source: H. Beldon, Illustrated
Atlas of Lanark County

7.18. Conclusion

This chapter provided insight into the types of farming that emerged on the landscape of Lanark from 1851/52 to 1871. The transition in agriculture over this period was not tremendous, as was shown by the relative stability of the principal component analysis between 1851/52 and 1871. This is remarkable considering that in the rest of Southern Ontario a major change was occurring, as was shown by Norton in his study of agricultural settlement patterns.²⁴ The shift in Ontario agriculture was from wheat farming to mixed farming, because it became more profitable to trade in a variety of agricultural products with an expanding American and Canadian market.²⁵

Over the two time periods, the types of farming in Lanark remained generally stable and associated with distinct regions in the county. Generally, Livestock and Mixed, Oat/Spring Wheat farming were associated with the better soils, while Cheese, Cattle and Forest/Fall Wheat farming were associated with the poorer soils. The relationship to the road system was not marked, although there was a tendency to find livestock farming in association with the more developed area.

In both periods there was some tendency for the Livestock farmer to be found where the road density was greatest. Conversely the Cheese, Cattle and Forest/Fall Wheat farmers were found in areas where the road density was least. This may testify to the fact that these farmers were just beginning to farm.

There was also a graduation in emphasis among the farms of this area, which suggested that there was some basis in fact to the seven verbal models of Lower. The first two components, which are statistically the most valuable, stress a type of mixed farming agriculture, one emphasizing livestock, and the other emphasizing crops, and in general terms agree with what Lower identifies as 'mixed farming.' Component III, in 1851/52, was shown to be in accord with what Kelly called 'feed-type farming,' a category which Lower's typology does not recognize. In 1871, however, component V resembles Lower's 'timber farmer.'

Obviously, all this is a matter of emphasis. Indeed, the components identified refer to elements of a particular farm. One cannot expect complete agreement between the statistical results of this exercise and the verbal model of a particular historian. Elements of similarity in the classes and the patterns of the components strengthens the interpretation of the types of farmers. Nonetheless, there is not complete agreement. Lower provides us with his

model, but individuals reporting to the census enumerators in 1851/52 and 1871 had never heard of Lower, nor thought to classify themselves by the epithets required by Lower's model. While this principal component analysis addresses the structure of agriculture as a continuum and Lower's typology provides for discrete classes, there is nonetheless some validity in the model in Lanark at this time.

FOOTNOTES

1. W.F. Massy, "Principal Component Regression in Exploratory Statistical Research," Journal of the American Statistical Association, vol. 60 (1965), pp. 234-56; B.J.L. Berry, "An Inductive Approach to the Regionalization of Economic Development," in N. Ginsburg (ed.), Essays on Geography and Economic Development, (Chicago, 1960), pp. 78-107; J.B. Riddell, "On Structuring a Migration Model," Geographical Analysis, vol. 2 (1970), pp. 403-9; R.J. Johnston, Multivariate Statistical Analysis in Geography, (New York, 1980), pp. 127-182.
2. K. Kelly, The Agricultural Geography of Simcoe County, 1820-1880, Unpublished Ph.D. dissertation, (University of Toronto, 1968), p. 68.
3. K. Kelly, "Notes on the Type of Mixed Farming Practised in Ontario During the Early Nineteenth Century," Canadian Geographer, Vol. XVII, No. 3 (1973), p. 205.
4. R.L. Jones, History of Agriculture in Ontario, 1613-1880 (Toronto, 1946), pp. 252-253.
5. Calculation of the author.
6. Ibid, published returns, p. 65.
7. K. Kelly, Op Cit., (1968) pp. 123-124
8. Ontario Agricultural Commission, Report of the Commissioners, (Toronto, 1881), p. 409.
9. P.A.C., Enumerator's Description of the Landscape of South Sherbrooke Township, Canada West Census, 1851, Lanark County, South Sherbrooke Township, Reel No. C-11731.
10. E.C. Guillet, The Pioneer Farmer and Backwoodsman, Vol. 2 (Toronto, 1963), p. 75.
11. P.A.C., Census of Canada 1851/52.
12. A.R.M. Lower, "Assault on the Laurentian Barrier," Canadian Historical Review, Vol. X (1929), p. 296.

13. Ontario Agricultural Commission, Op. Cit., p. 328.
14. E.C. Guillet, Op. Cit., pp. 77-78.
15. Ontario Agricultural Commission, Op. Cit., p. 322.
16. P.A.C., Census of Canada, 1851/52, Vol. II (Quebec, 1853), p. 65; Census of Canada, 1871, Vol. III, Tables XXIV, p. 224-229.
17. R.L. Jones, Op. Cit., p. 253.
18. K: Kelly, "The Impact of Nineteenth Century Agricultural Settlement on the Land," in J.D. Wood (ed.), Perspectives on Landscape and Settlement in Nineteenth Century Ontario, No. 91, (Toronto, 1978), pp. 74-75.
19. P.A.C., Canada Farmer, Vol. 1, No. 6, (Toronto, 1864), p. 161.
20. C.G. Head, "Nineteenth Century Timbering and Sawlogging in the Ottawa Valley: Documentary Sources and Spatial Patterns", in V. Ivonoffski and S. Campbell (eds.), Exploring Our Heritage: The Ottawa Valley Experience, p. 57.
21. J.J. Mannion, Irish Settlements in Eastern Canada, (Toronto, 1974), p.76.
22. Ontario Agricultural Commission, Op. Cit., pp. 356-359.
23. P.A.C., National Map Collections, NMC 12437, Major G.F. Baron de Rottenburg, "Map of the Principal Communications in Canada West." 1850, Scale of 1:126,720; P.A.C., National Map Collection, NMC 21920, H.F. Walling, "Map of the Counties of Lanark and Renfrew, Canada West." 1863, Scale of 1 inch to 1.5 miles; H. Beldon and Company. Illustrated Atlas of Lanark County, 1880. (Owen Sound, 1972).
24. W. Norton, "Agricultural Evolution on the Frontier," The Professional Geographer, Vol. 36, no. 1, (1984), pp. 22-23.
25. R.C. Harris and J. Warkentin, Canada Before Confederation, (London, 1974), p. 137.

CHAPTER EIGHT

CROP AND PASTURE LAND

2

CHAPTER EIGHT

CROP AND PASTURE LAND

8.1 Purpose

In the previous chapter, it was shown that there were two broad groupings of agricultural activity in this time period. These were seen in terms of the structure of the components, which represented a livestock/crop mixed farming type of agriculture, or in the context of the time, a less established series of types including, for example, cheese making and specialized grains. Plots of the components scores supported this notion of a dichotomy between developed and less developed areas. The suggestion is given added strength by examination of Figures 5.3 to 5.6, which show the distribution of crop and pasture lands as percentages of total holdings. This chapter will qualitatively describe the extent to which each of the components were associated with the amount of crop and pasture land, taken as respective surrogates for developed and less developed agriculture.

In Lower's scheme, the "established farmer" would be found in the more developed areas with larger amounts of

crop land. In the context of Chapter Seven, this should mean that the livestock/crop mixed farmer would be most strongly associated with large amounts of crop land. Conversely, Lower's other categories should be more closely associated with the less developed areas in which pasture land was predominant. The purpose of this chapter is to make this relationship more apparent. Although the objective is simply a more succinct description, the method is multivariate. This approach also presents, by examination of the residuals from regression, insights into the role of the environment and of accessibility.

8.2 Method

Multiple regression of the following form was employed:

$$Y = b_0 + b_1X_1 + b_2X_2 \dots b_nX_n$$

where Y was the predicted dependent variable, b_0 was the intercept value, $X_1, X_2 \dots X_n$ were independent variables and $b_1, b_2 \dots b_n$ were the regression coefficients describing rates of change in the variables X_1 to X_n .¹ The components for 1851/52 and 1871, as presented in Table 8.1, were regressed against the dependent variables, acres of crop land and pasture land. Additionally, the percentage of crop and

pasture land were also used (Appendix F). Stepwise regression was used on a series of logarithmically-transformed variables. The method is a standard tool of analysis, which permits the researcher to identify the most

TABLE 8.1	
Principal Components 1851/52 and 1871	
1851/52 Components	Description
X ₁	Livestock/Mixed Farming
X ₂	Mixed Farming/Lumbering
X ₃	Crop/Grain Farming
X ₄	Cheese Making
X ₅	Oxen/Cattle Farming
1871 Components	Description
X ₁	Livestock Farming
X ₂	Oat/Wheat/Mixed Farming
X ₃	Cheese Making
X ₄	Cattle Farming
X ₅	Forest/Fall Wheat Farming

significant variables according to the order in which they emerge from the analysis. The resulting regression equations are general descriptive statements of the nature of agriculture at each of the two periods.

8.3 Results of the 1851/52 Regressions

Table 8.2 shows the equation of the stepwise multiple regression for crop and pasture land for 1851/52. All five components were included in the analysis; of these, all five proved statistically significant with crop land, while

TABLE 8.2					
Principal Component Stepwise Multiple Regression Equation for Crop and Pasture Land for 1851/52					
Dependent Variable	N	R ²	F	Comment	
Cropland					
$Y=2.71+0.47\log X_1+0.33\log X_3+0.32\log X_2+0.18\log X_5+0.16\log X_4$	263	0.642	92.31	*	
Pastureland					
$Y=2.71+0.37\log X_2+0.28\log X_1+0.17\log X_5+0.14\log X_4$	249	0.241	19.33	*	
* Significant at the 95 percent confidence level					
** For identification of the variables see Table 8.1					

four components were significantly correlated with pasture land. Sixty-four percent of the variation in the crop data was explained by the five variables. In each instance the overall equations were significant at the 0.05 level of significance.

In absolute terms, the Livestock/Mixed farming (X_1) possessed the most significant amount of crop land, possibly indicating a type of farm where crops and grains were used as feed for the livestock as well as sold to nearby urban centres and lumber camps. Also significant in crop land was the Crop/Grain farmer (X_3) who concentrated solely on crops that were sold at local markets and retained very little feed for himself since he possessed very few animals. The Mixed Farming/Lumbering (X_2) also required crop land for raising a balanced amount of livestock and crops. Oxen/Cattle farming (X_5) and Cheese making (X_4) were the least associated with crop land because such activity was less intensive, cattle often being accommodated within the forest margin.

The stepwise procedure with the same independent variables showed Mixed Farming/Lumbering (X_1) as being the most significant in pasture land. Second in importance was the Livestock/Mixed farming (X_1), followed by Oxen/Cattle farming (X_5) and Cheese making (X_4). Crop/Grain farming (X_3) proved to be non-significant when it came to pasture

land. This was understandable since Crop/Grain farming (X_3) had virtually no livestock and required very little pasture land (Table 7.2).

The Mixed Farming/Lumbering (X_2) type of agriculture would account for the largest amount of cleared land in the form of pasture, if the farmer was cutting timber on his own lot. To make use of this forest-cleared land and to supplement his income, this type of farmer would raise sheep and cattle and grow hay to sell to the same lumbermen to whom he delivered his timber or for whom he worked in the winter.

8.3 Residual Distribution

In an effort to further establish the factors affecting the types of farming in Lanark, the crop and pasture land residuals from these regressions were also studied.

Plots of the standardized residuals are represented on Figures 8.1 and 8.2. These residuals identify observations greater than one standard error. Figure 8.1 shows areas with significant clusters of greater-than-expected crop land (positive residuals) were situated in Lanark, Drummond and North Elmsley Townships with smaller concentrations in the northern regions of Sherbrooke and Dalhousie. Stretching in a northerly direction through the centre of Bathurst

Township and ending at the Town of Lanark, is a significant area of less-than-expected crop land (negative residuals). There are also additional clusters of negative residuals in Pakenham, Drummond, Beckwith and Montague Townships.

In comparing the pattern of standardized crop land residuals to some of the previously-discussed maps and plots such as Towns and Townships (Figure 2.1), Geology and Geomorphology (Figure 2.2), Lakes and Rivers (Figure 2.3), Soil Capability (Figure 2.4) and 1851/52 Cropland (Figure 5.3), only a few relationships can be diagnosed. The first of these points to a cluster of positive and negative residuals located north and south of the Town of Lanark. Both clusters are found in a variety of soils; the positive residuals north of the town are located in mainly a Class 7 with some Class 2 and organic soils, while the negative residuals (south) are again mainly associated with Class 7 soil with a small amount on Classes 3 and 6 soils (Figure 2.4). Similarly, a second concentration of negative crop land residuals appears south of the Town of Pakenham, over Class 1 soils. This stands in contrast to an area of positive residuals situated primarily on Class 7 soil in Dalhousie Township. It appears that the concentrations of positive and negative crop land residuals are located over a range of soils, which seem to occur independent of the physical environment.

Distribution of Crop Land Residuals for 1851/52

Figure 8.1

Source: PAC, Census Enumeration Returns
for 1851/52. Compiled by Author

Comparing Figure 8.1, which shows crop land residuals to the road map for this period (Figure 7.14), reveals that there is little or no relationship to the road system, although a major cluster of positive residuals in central Lanark Township does extend across the major north/south system of roads between the Towns of Perth and Pakenham. The majority of the other positive and negative residuals are located away from the road system.

The pattern of positive residuals corresponding with the major agricultural areas are identified on Figure 7.12. These are areas of Crop/Grain (X_3), Oxen/Cattle (X_5) and Mixed Farming/Lumbering (X_2). Some of these residuals associated with the Mixed Farming/Lumbering (X_2) had a great deal of crop land in a specific crop such as Peter Cotts (concession VI, lot 23) of North Elmsley Township with 23 acres in wheat. The Crop/Grain farming (X_3) such as John Craig (concession III, lot 17), Crawford Dodds (concession IV, lot 14), and Samuel Lett (concession V, lot 11) of Lanark Township were using their crop land for raising rye, corn and peas. Some of the positive crop land residuals, where actual development was greater than indicated by the multiple regression equation, were associated with Oxen/Cattle (X_5) farming. This was particularly true in South Sherbrooke for William Hannak (concession III, lot 12) who grew very few crops but harvested 30 tons of hay.

from his crop land. These individuals produced more than the average farmer.

The average amount of crop land associated with the cases that were greater than one standard error above the regression line was 30.8 acres; this was 10.7 acres above the mean for all the cases throughout Lanark at 20.1 acres (calculation by the author). The mean for the cases that were less than -1 standard error was 7.3 acres, considerably below the average for the county.

Many of the negative crop land residuals were located in areas where there were different types of agriculture but not one significant type (Figure 7.12), such as in central Bathurst and parts of Montague, Drummond, Beckwith and Pakenham Townships. Some of the settlers that had less-than-expected crop land also owned small amounts of pasture land, like the cluster of four farmers that were located south of the town of Pakenham on the following lots.

These four individuals all grew oats, potatoes, hay and had at least one milk cow and one hog. Another common trait among the four was that they did not produce cheese. The small amount of cleared land indicates that these settlers were new and/or poor, perhaps relying on the forest industry as a source of employment to supplement their income.

TABLE 8.3					
Settlers in Pakenham Township, 1851/52					
		Land			
Concession	Lot	Held	Cleared	Crop	Pasture
V	7	100	10	8	2
VII	8	50	9	6	3
IX	9	50	5	3	2
X	12	100	7	4	3
Source: P.A.C., Census of Canada, 1851/52, Canada West, Lanark County					

With such a small amount of pasture land these four settlers also appear as a cluster of negative residuals on the pasture land residual map (Figure 8.2). On this map, another area of less-than-expected pasture land can be found in north-central Bathurst. There are also two significant areas of greater-than-expected pasture land; one of these covers a large portion of Dalhousie while the other is found in Drummond Township.

Comparing the standardized pasture land residual map to various other maps (Figures 2.1, 2.2, 2.3, 2.4, 5.4 and 7.14) provided few additional insights. The different clusters of positive and negative pasture land residuals were found, as with the crop land, on a variety of soil types. There was again, however, a concentration of resi-

Distribution of Pasture Land Residuals for 1851/52

Figure 8.2

Source: PAC, Census Enumeration Returns
for 1851/52. Compiled by Author

duals near the Town of Lanark, overlapping some of the crop land residuals from Figure 8.1. It appears that the greater-than-expected pasture lands, especially those in Dalhousie Township occur in association with the Canadian Shield, similar to the pasture land distribution in Figure 5.4.

The cluster of greater-than-expected pasture land on Classes 1,2 and organic soils in Drummond Township consists of the following lots:

TABLE 8.4					
Settlers in Drummond Township, 1851/52					
Concession	Lot	Land			
		Held	Cleared	Crop	Pasture
II	13	150	60	12	48
V	9	100	50	11	39
VI	5	200	100	25	75
V	2	100	40	0	40
VIII	8	100	45	15	30
Source: P.A.C. Census of Canada, 1851/52, Canada West Lanark County					

This cluster consists of a group of farmers having from 30 to 75 acres of pasture. All but one had some land in crops. Milk cows and hogs were found on all the farms with a blend of some oxen/steers, sheep and horses. Crops were

very limited, with wheat being the most common, grown on four of the five farms. The farmer without wheat was John Davison (concession V, lot 2), who had no cropland, only pasture. This individual maintained some livestock consisting of 4 hogs, 6 sheep, 2 cows, 1 calf and 4 oxen/steers. Possessing only pasture land and no crop land may indicate that this settler had spent considerable time clearing land, possibly only for the timber, although he may simply have been ill-disposed to grain cultivation and may have gained his livelihood from timber sales. This probably also applies to the other farmers in this cluster, considering the large amount of pasture.

When the residual map is compared to the major agricultural regions (Figure 7.12), many of the positive residuals such as in Dalhousie Township and those already discussed in Drummond Township, were found to be located in regions where there was no major types of farming. The types of farms that existed in these areas were different from the 5 significant kinds of farming in Lanark of 1851/52. These farmers, such as in Drummond Township, had large amounts of cleared land, mostly in pasture, and were raising a moderate amount of mixed livestock with some wheat. To what this rugged individualism can be attributed is unknown.

8.5 Significance of 1851/52 Residuals

In 1851/52, certain types of agriculture such as the Livestock/Mixed farming (X_1) possessed large amounts of both crop and pasture while other types like the Crop/Grain (X_3) agriculture only maintained land in crop.

Residuals of crop and pasture land were found to occur in clusters or were scattered throughout Lanark. There were only a few associations of the residuals with either soils, roads or urban centres. While some of the residuals were located in areas where there were major types of agriculture, other residuals were found outside these major regions.

8.6 Results of the 1871 Regressions

Stepwise multiple regressions of crop and pasture land with the 1871 principal components are presented in Table 8.5. The proportion of variation explained by the independent variables was 41.1 percent which is considerably lower than the 64.2 percent for the cropland variable in 1851/52. The amount of variation accounted for in the 1871 regression of pasture land with the different farm types was 15.9 percent. This value is again lower than the 1851/52 variation of 24.1 percent for pasture land.

Clearly, the proportion of unexplained variation for 1871, represented by the principal components and the dependent variables of crop and pasture land was greater than in the 1851/52 regression.

TABLE 8.5				
Principal Component Stepwise Multiple Regression Equation for Crop and Pasture Land for 1871				
Dependent Variable	N	R ²	F	Comment
Cropland				
$Y=3.65+0.43\log X_2+0.18\log X_4+0.12\log X_1+0.14\log X_3+0.11\log X_5$	373	0.411	51.27	*
Pastureland				
$Y=3.03+0.24\log X_4+0.22\log X_3+0.15\log X_2+0.15\log X_5$	375	0.159	17.59	*
* Significant at the 95 percent confidence level				
** For Identification of the Variables see Table 8.1				

Perhaps the increased unexplained variation, which represents a relative absence of order in 1871, compared to 1851/52, reflected change and diversification in the agri-

culture of Lanark. Some of the factors which affected this change, and which were not present in 1851/52 were: 1) the Reciprocity Treaty of 1854, which created a previously non-existent market for Canadian goods in the United States; 2) colonization roads extending into unsettled and agriculturally poor regions of the county, which may have temporarily located some types of farming on lands that were not suitable; 3) perhaps a decreased source of good timber in Lanark, causing the lumber shanties to migrate further into the Shield.

In 1871, Oat/Wheat Mixed farming (X_2) had the most significant relationship with crop land. This type of farming was really the diversified Crop/Grain farm (X_3) of 1851/52. The grain agriculture of 1851 had shifted to mixed agriculture. The change from a wholly grain to mixed farming was not just prevalent in Lanark, but also present in Simcoe County where lumbering was also common.³ Cattle farming (X_4) also possessed a noticeable amount of crop land. It is not clear what this type of farmer used the substantial cropland to grow, since only a few crops were produced, such as spring wheat, turnips and hay.

Component I, Livestock farming (X_1), appeared third in the multiple regression. This was to be expected. The lands in this type of farming were likely involved in a rotation method of crop production which included fallow

land and manuring. Cheese making (X_3) and Forest/Fall Wheat farming (X_5) were the least significant in crop land. These two types of farmers were not heavily involved in agriculture, but either grew or produced certain kinds of goods such as cheese, winter wheat and garden produce to sell to the shanties. Probably, they spent most of their time cutting timber on their own lot or working in the lumber camps.

The stepwise multiple regression of pasture land with the same five principal components showed Cattle farming (X_4) as the most significant, followed by Cheese making (X_3), Oat/Wheat Mixed farming (X_2) and Forest/Fall Wheat farming (X_5). Livestock farming (X_1) was statistically insignificant when it came to pasture land. This appears contradictory, but the contradiction is more apparent than real. A reason for the lack of pasture by Livestock farming (X_1) was probably because much of the pasture recorded by the other types of farming were mainly just newly cleared forests. These large amounts of cleared forest land were recorded as pasture but likely a majority of the land was never used and had only been cleared for the timber. The over emphasis upon pasture land by some types of farming, for example, had made the amount used by Livestock farming (X_1) appear insignificant. In retrospect, this type of farmer was probably only clearing land

that he was actually using for agricultural purposes. These lands were located in the more established areas of Lanark (Figure 7.13) where lumbering had decreased significantly as had the cutting of forests just for timber. The pasture land of the Livestock farmer (X_1) was no doubt qualitatively different to other types of farming which contained pasture land.

Livestock farming (X_1) of 1871 was similar to 1851/52 Livestock/Mixed Farming (X_1) (Chapter Seven). In 1851/52 Livestock/Mixed farming (X_1) was the most common type of agriculture, accounting for most of the crop land and a significant amount of pasture. However, in 1871, Livestock farming (X_1) was still the most popular type of agriculture. This farmer was not necessarily operating on a decreased amount of land compared to his counterpart of 1851/52. What had happened over the twenty years was probably that the absolute amount of pasture land increased, although a great deal of it was rough, newly cleared forest. The rate of improvement was greater for those who had nothing in 1851/52.

The other major types of farming in 1871 were Cheese making (X_3) and Cattle farming (X_4) which had significant amounts of pasture land, most of which was probably newly cleared forests and not actually used as pasture. Both types were a subsistence agriculture, limited in crops,

3 of/de 3

THE MICROLITHOGRAPHY GROUP OF THE MICRONAL GROUP

MICROLITH

THE MICRONAL GROUP OF THE MICRONAL GROUP

with some livestock, but heavily involved in cutting trees from their lots and participating in the timber trade. Oat/Wheat Mixed farming (X_2) was the second most common type of agriculture in 1871, having a somewhat less significant amount of pasture land than crop land. The division of land between pasture and crop for the Oat/Wheat Mixed farming (X_2) was established in such a way as to have fields with crops of oats and wheat rotated with peas and potatoes. Every few years these were probably left fallow as pasture for grazing and hay.

Forest/Fall Wheat farming (X_5) was least associated with both crop and pasture. As identified earlier, this type of farmer was growing mainly fall wheat and not heavily involved in clearing timber off his own lot but likely participating, especially in winter, as a teamster or lumberjack in the logging camps.

8.6 1871 Residual Distribution

As before, the residuals were plotted and scanned for insight into additional factors. A plot of the standardized crop land residuals appears on Figure 8.3. These residuals are less concentrated than the 1851/52 distribution (Figure 8.1). Dalhousie Township had the largest concentrations of greater-than-expected crop land with

Distribution of Crop Land Residuals for 1871

Figure 8.3

Source: PAC, Census Enumeration Returns
for 1871. Compiled by Author

another significant cluster in North Elmsley. The largest clusters of less-than-expected crop land appear in North Burgess and Pakenham Townships.

Comparison of Figure 8.3 with Figures 2.3, 2.4, 5.3 and 7.14 to 7.16 produced only one association and that was with the road network. The 1850 road map (Figure 7.14) shows that most of the major roads at that time extended over the most populated and better soil regions (Figure 2.4) of Lanark, travelling between the Towns of Perth, Carleton Place, Almonte and Pakenham (Figure 2.1). This road system still existed in 1863 (Figure 7.15) and in 1880 (Figure 7.16), but was somewhat obscured with the additional roads that were constructed. The area represented by this road system between the Towns of Perth and Pakenham corresponded with one of the very few clusters of crop land residuals. This area, as already mentioned, contained the best soils in the county and also had the most established type of agriculture, - Livestock farming (X_1) (Figure 7.13).

Many of these residuals of Figure 8.3 were not associated with particular types of farming. One of these areas was situated in North Elmsley Township where a cluster of positive crop land residuals were located on the following lots:

TABLE 8.6					
Settlers in North Elmsley Township, 1871					
		Land			
Concession	Lot	Held	Cleared	Crop	Pasture
9	2	200	125	75	50
10	4	200	150	130	20
9	7	200	120	105	15
8	11	100	60	40	20
10	11	200	134	114	20
Source: P.A.C. Census of Canada, 1871, Lanark County North and South					

The amount of crop land recorded by all these lots was very high. One would expect that with such a large amount of crop land, there would be a considerable amount of crops grown. Yet some of these farmers, such as Charles Murdock, (Concession 9, lot 2), had only produced 10 bushels of oats, 50 bushels of potatoes and 2 tons of hay from 75 acres of crop land. In fact, all the farmers in these 5 lots were producing very small amounts of crops considering the large amount of crop land each possessed.

Figure 8.4 represents the distribution of pasture land residuals in Lanark for 1871. These residuals appear more scattered than the crop land residuals. There are a few distinct clusters; one in Ramsay Township was of less-

Distribution of Pasture Land Residuals for 1871

Figure 8.4

Sources: PAC, Census Enumeration Returns
for 1871. Compiled by Author

than-expected pasture land, while two others of greater-than-expected pasture land were very close to one another, in South Sherbrooke and Bathurst Townships. The cluster of negative residuals in Ramsay Township were partially on good soils of classes 1, 2 and 3 with the remainder on Class 6 soils (Figure 2.4). The two clusters of positive residuals in South Sherbrooke and Bathurst were totally on Class 7 soil.

Again, as with the crop land residuals, most of the pasture land residuals were located in regions where there was no distinct type of farming.

Overall, the greater portion of negative pasture land residuals were on good soil; the majority of positive residuals were on poor land. Obviously the physical environment was a factor. This is different from the 1851/52 situation; an additional twenty years of experience had allowed the Lanark farmers to adjust to the physical environment.

Only one residual of the two greater-than-expected clusters in South Sherbrooke and Bathurst, was associated with any of the major types of farming. This was found in the zone of Forest/Fall Wheat (X₅). The remainder of the residuals in each cluster were not linked to any specific type of farming (Figure 7.13). The cluster of positive residuals in the eastern portion of South Sherbrooke, with

one of its six observations having a value of greater than +2 standard errors consists of the following lots:

TABLE 8.7						
Settlers in South Sherbrooke and Bathurst Townships, 1871						
Township	Concession	Lot	Held	Cleared	Crop	Pasture
S. Sherbrooke	VI	18	266	120	45	75
"	IV	22	50	40	10	30
"	I	11	280	100	50	50
"	II	17	175	100	30	70
Bathurst	V	2	200	120	40	80
"	VII	4	200	40	10	30
Source: . P.A.C. Census of Canada, 1871, Lanark County North and South						

All six observations had anywhere between 1/2 to 3/4 of their cleared land in pasture. The major crops for these observations were spring wheat, oats, potatoes and hay; but not all the farms grew these. The production of these crops per farm was below the average for Lanark. Livestock such as milk cows, beef cattle and swine were raised on all the farms, while horses and sheep were found on most of the farms. Butter was produced on all the farms, which was in contrast to cheese which was not found in any of the observations. As with the crops, the livestock production for each case was below the average output per farm for the county. Butter production was also below the average. The average amount of crop land per farm in Lanark for 1871 was

49 acres. This average was greater than all the cases in the above cluster, except for Timothy McCarthy (Concession 1, lot 11) in South Sherbrooke which had 50 acres of crop land. This below-average crop land was certainly a factor contributing to the small amount of crop production. The average amount of pasture land for Lanark in 1871 was 27 acres.⁴ This, in contrast to the average amount of crop land was well below the amount for most of the observations in the cluster. With such a large amount of pasture land, one would think there would be a large number of pasture livestock, which there were not.

The below-average livestock and above-average pasture land indicates a large amount of land probably cleared for its timber. Indeed, the location of this residual cluster was close to an area where there was an indication of lumbering as shown in Figures 4.2 and 4.5, but where the farming was not similar to any of the 5 major types that existed in 1871.

8.7 Significance of 1871 Residuals

It is interesting to note that in these instances (Table 8.6), where large amounts of land were cropped, sufficiently large to be identified as a positive residual, often small amounts of specific crops were produced, e.g.

oats, potatoes and hay. These were probably cases of excess land clearing where farmers identified much of their cleared land as crop land but used only a small portion of it for actual crop production. This small crop production could mean that crops were not a major source of income or that these farmers were not industrious.

There was a tendency for some of the large clusters of negative pasture land residuals to locate on good soils in Ramsay and Pakenham Townships. These negative residuals indicate that regions with good soils had farms with less pasture land and probably more crop land. The opposite of this appeared in South Sherbrooke Township, where greater-than-expected pasture land was found on very poor soils. These pasture-abundant farms (Table 8.7), however, had below-average number of grazing livestock, indicating that there had been excess land clearing, probably for lumber. However, particular circumstances might have rendered the farmer unable to stock his land.

8.8 Summary

In 1851, the agricultural types most clearly associated with the large cropped acreages were, as was to be expected, grain and mixed farming (X_1 , X_2 , X_3), followed by a diminishing emphasis upon pasture-related farming, such as the Cheese farm (X_4) and the Oxen/Cattle farm (X_5). By

1871, this situation had changed. Cattle farming (X_4) had replaced the Crop/Grain farming (X_3) of 1851 as the second type most closely associated with developed crop land. If this is not a statistical anomaly, resulting in Cattle farming (X_4), returning pasture land as crop land, it might well indicate that by 1871, agriculture within the "developed" and crop zone was showing signs of increased diversification.

With respect to pasture farming in 1851, as might be expected, crop/grain farming (X_3) did not contribute to pasture land. In 1851, pasture land was associated with Mixed Farming/Lumbering (X_2) and Livestock/Mixed farming (X_1); however, by 1871 the mixed farming disappeared, Oat/Wheat Mixed farming (X_2) appeared third, and Cattle farming (X_4) and Cheese making (X_3) appeared first and second in terms of their contribution to the amount of pasture land. By 1871, it would seem that pasture land was a more specialized zone associated primarily with cattle and cheese making.

In terms of the agricultural typology, it is apparent that many of the "elements" appear in both established and less established areas. Some of the classes of farmers became more important as time went on. For example, the cattle farmer in 1851 appeared second last in his contribution to both pasture and crop land. By 1871, as might be

expected in an area with an increasing pasture emphasis, he was a more obvious figure. Labelled "cattle farmer," he was seen to resemble Lower's "timber-harvester," an inference based upon his proximity to the Shield. Similarly, the "cheese maker," one of the least important figures statistically in the 1850's, contributed more to crop land and more especially to pasture land by 1871. In 1851, in Lower's terms, the cheese farmer may well have been a "new or poor farmer" or indeed even a "squatter," although there is no absolute proof of the latter. By 1871, his contribution to crop and pasture land improved as probably did his income, because of the passage of time and the developing emphasis upon cheese production in Eastern Ontario, reflecting foreign demand.

If the cheese farmer was a newly established type in 1851, Forest/Fall Wheat farming (X5) was a new phenomenon in 1871. This type of farmer contributed little to pasture land or crop land, i.e., his holdings were small and from the plot of component scores, he was seen to be located primarily in more remote locations near lumbering areas. Lower has no class for this farmer, unless he fits into the "new or squatter" category. Certainly, the size of his holdings would be in keeping with this. Whatever the class of farmer, he was an individual who took advantage of the lumber market, and also took advantage of the local en-

vironment to grow fall wheat in forest protected regions, thereby gaining higher yields over spring wheat. The other element in this type of agriculture, which received little emphasis among the other types of farming, was the production of vegetables, again in demand in the lumber camps.

The "established farmer" of Lanark County in 1851 and 1871 was a mixed farmer, although as the century wore on, those farming larger acreages of crop land on the more environmentally suitable parts of the County placed greater emphasis upon grain, especially oats.

In addition to insight into the association of size of farm with particular agricultural types and the changed agricultural emphasis through time, this chapter has identified an association with the quality of the physical environment. Examination of residuals greater than one standard error for both 1851 and 1871, showed no apparent order with respect to the physical environment in 1851. By 1871, this had changed. Clusters of less than expected pasture land were found on good soils and greater than expected pasture land was found on poor soils. It would seem that through time, the farmer made adjustments, becoming more aware of the advantages and limitations of his land. This adjustment process has also been recognized by Gentilcore.⁵ Most of the pasture land was in western and south-western Lanark, towards or on the Canadian Shield

(Figure 5.6). Conversely, the better agricultural land, developed by the established farmer, was central and eastern (Figure 5.5) and was shown to be more accessible in terms of the road network and proximity to urban centres.

Not all of Lower's settlers were evident in this chapter. The difference primarily exists because Lower has looked at his individuals from the point of lumbering, while this thesis is concerned with the types of farming. Qualitatively, Lower has generated descriptions of various types of settlers dependent upon the lumbering market. This thesis, in particular Chapters Seven and Eight, is an exercise in statistical probability that has produced types of farming that resemble Lower's settlers. With such an exercise it is unlikely that the fit to a verbal model will be exact; given this, the resemblance to the Lower typology is remarkable.

FOOTNOTES

1. M. Ezekiel and K.A. Fox, Methods of Correlation and Regression Analysis, (New York, 1959), pp. 151-157; R.J. Johnston, Multivariate Statistical Analysis in Geography, (London, 1978), pp. 68-69.
2. Ibid, pp. 84-87; H.E. Parson, "An Analysis of Farmland Abandonment Trends: A Study of Central Ontario," Ontario Geography, (Toronto, 1979), pp. 41-57.
3. K. Kelly, "The Impact of Nineteenth Century Agricultural Settlement on the Land," in J.D. Wood (ed.), Perspectives on Landscape and Settlement in Nineteenth Century Ontario, (Toronto, 1978), pp. 74-75.
4. Calculated by the author.
5. R.L. Gentilcore, "Changes in Settlement in Ontario, 1800-50: A Correlation Analysis of Historical Source Materials," International Geography, (1973), pp. 418-419.

CHAPTER NINE

SUMMARY AND CONCLUSION

CHAPTER NINE

SUMMARY AND CONCLUSION

9.1 General Summary

In 1851/52, mixed farming in Lanark County was the predominant type of agriculture, while in the rest of Ontario it was just becoming a common type of farming. The soil on which this mixed farming existed was relatively low in agricultural potential (classes 4,5,6 and 7) compared to Southwestern Ontario, where the better soils of classes 1, 2 and 3 were more common. A major reason for the deficient soils of Lanark was the Precambrian rock of the Canadian Shield which covered about two-thirds of the county, making it difficult to farm.

The agricultural conditions in Lanark County compare to Norton's study of agricultural evolution on the settlement frontier of Southern Ontario between 1851 and 1891, where a transition occurred from a subsistence type of farming to a specialized, commercially-oriented agriculture.¹ The mixed farming of Lanark County could be divided into two basic groups: one that concentrated on livestock, and the other that was more crop oriented. One of these types of farming

was a specialized Crop/Grain farmer, who in 1851/52 raised virtually no livestock, only crops. At this time, there were also farms concentrating on the production of cheese. These also existed in 1871, and were probably predecessors to the early cheese factories. In 1871 there were also Cattle and Forest/Fall Wheat farmers, who were not intensive agriculturists but generally concentrated on only a few crops and livestock. The produce grown by these farmers was sold to the shanties and once this was done they usually obtained employment in the lumber camps to supplement their income.

Agricultural yields per acre for various crops in 1851 were lower on Lanark farms than for the rest of Upper Canada. The most common crops in Lanark between 1851-71 were oats, wheat, potatoes, and peas.

The amount of crop land increased substantially in Lanark over the period from 1851 to 1871. While there was no apparent relationship between crop and pasture lands and the physical environment in 1851, this was not so in 1871. By this latter period, it appears that the more established type of farming with greater amounts of cropland, were found in areas of the county that had better soils and were more settled, while the subsistence-type of farming with larger amounts of pasture were situated in the more remote regions of Lanark on some of its poorest soils.

Forests were abundant in the county, making lumbering the principal industry of the region. Agriculture played an important role in supporting this forest industry by supplying farm produce to the lumber camps. The forest industry, until about 1860, was the sole market for agricultural products in Lanark. After 1860, however, alternative major markets were found in the United States and Great Britain. Not only were Lanark's agricultural products now being exported, they were also being consumed by an increasing Canadian population. In response to the increased demand for agricultural produce, there was a shift to higher-quality, specialized types of farming in Ontario, noted by Lawr, especially after 1870.² Some of this shift to specialized farming occurred in the production of cheese, butter and beef and was evident in Lanark County.

9.2 Conclusion

Agriculture and lumbering in Lanark went hand-in-hand for most of the nineteenth century. As lumbering prospered, so did the farmers who sold agricultural produce to the lumber camps, and it was not until after the coming of the railway that markets outside of the forestry sector were sought. Some farmers participated in the timber trade

by cutting their own logs and selling them to either the lumbermen or local sawmills.

The two distinct regions of lumbering that emerged in Lanark catered to different markets. Squared pine and pine logs found within the tributaries of the Mississippi and Madawaska Rivers were floated down the Ottawa River to Quebec City and then shipped to Great Britain. A second lumbering region existed in the south and southeastern portion of the county, where all types of timber were cut and sent, first by way of the Rideau River, and later also by rail, to markets in the northeast United States. Major rivers such as the Mississippi and Rideau played an important role in the timber trade, acting as avenues along which forest products were shipped to waiting markets.

1861 was a good year for the forestry sector in the Ottawa Valley, where trade, especially to the United States, was at an all-time high. Crops such as wheat, oats, peas, potatoes, corn and barley, in output per farm, reached a peak in 1861, which was a high for the period 1841 to 1871. Oats and wheat proved to be the most common crops in the county, grown on well over one-half of all the crop land. Peas grew steadily in popularity, probably because of their importance as a rotation crop. In 1871, Lanark had only a few exportable goods and butter was one of them, largely because there was a demand in the United States.

While mixed farming was the major type of agriculture, it soon became evident that two versions existed. Livestock/Mixed farming was the most common, where animals such as milk cows, sheep and hogs were prevalent. Livestock products such as butter, cheese, wool and pork were significant, indicating that a market existed for these goods. This type of mixed farming existed in both 1851/52 and 1871. The second type of mixed farming was best represented by the Mixed Oat/Spring Wheat farmer, who was predominantly raising crops, while livestock and their products were not as important.

The specialized Crop/Grain farmer of 1851/52, who had likely increased his number of livestock, (previously virtually non-existent), became the Mixed Oat/Spring Wheat farmer of 1871. This change over the period from strictly crops and grains to a more mixed farming possibly occurred because of the need for manure from livestock for application to fields to maintain a level of fertility.

The Cattle farmer of 1871 was shown to be located close to lumbering regions, raising beef cattle and some sheep that were probably sold to the shanties.

Another frontier farmer was the Forest/Fall Wheat farmer who grew garden produce, fall wheat and raised hogs. This type of agriculturist, who supplied produce to the lumber camps, probably became quite common along

colonization roads and new areas of settlement on the Canadian Shield. In the last quarter of the nineteenth century, it became evident that lumbering was beginning to subside in Lanark County. As the forest frontier retreated further and further into the Canadian Shield, these settlers found it difficult to survive. Abandoned farms were frequently seen in areas where lumbering once prospered.

This thesis, in addition to providing insight into the types of farming that existed from 1851 to 1871, also adds support to Lower's model of forest frontier settlers. Most of the settlers/farmers described by Lower can be identified with some similarity to the component models produced by the analysis.

For example, certain elements of Lower's 'established farmer' can be found in the first component of both 1851/52 and 1871. Other types, such as the 'farmer-lumberman' and 'shanty farmer' closely represent Lanark's Mixed Farming/Lumbering and Mixed Oat/Spring Wheat farming. Specialized types like the Oxen/Cattle farmer, the Cheese maker, the Cattle farmer, and Forest/Fall Wheat farmer resemble some of Lower's remaining settlers like the 'new or poor farmer,' 'teamster,' 'timber harvester' and 'squatter.' The component models and Lower's verbal model complement one another and show that Lanark County was quite similar to a forest frontier farming region described by Lower.

A more succinct description of the component farm types was presented when they were examined in the context of crop and pasture lands. These lands represented developed and less developed, agriculture and were situated in distinct areas of Lanark as was evident in the plots of Figures 5.3 to 5.6. Generally, the trend in 1851 was for grain and mixed farming to be associated with large crop acreage, while more extensive pasture land was linked with livestock/mixed farming. In this time period, the more established mixed farming was abundant in both crop and pasture land. By 1871, a more distinct association of developed and less developed agriculture with crop and pasture land occurred. Less established types of agriculture, such as cheese and cattle farming, were associated with extensive amounts of pasture land. High percentages of crop land were linked to mixed farming, primarily oats and wheat.

In both 1851 and 1871, the more established agriculturists in Lanark were the mixed farmers, generally found on the more developed lands. In 1871, there appeared to be some "order" on the land, where established farmers with large amounts of crop land, were located on the better soils, while less developed farming with usually more pasture was situated on the Shield. This association was also apparent when examining the residuals greater than one

standard error for both 1851 and 1871. It appears that over time the farmers of Lanark had made an adjustment to the physical environment and were much more aware of the quality of the land.

Mixed agriculture was well established in Lanark County by 1851/2, a time when it was just becoming popular in Southwestern Ontario. Demands by the forestry sector for various farm products appears to have encouraged not just one basic form of agriculture but various types. In addition to mixed farming, there also existed specialized farmers who concentrated either on an agricultural product, crop or livestock. These findings exceed the agricultural literature on Eastern Ontario in the nineteenth century, which simply describes a basic type of farming, essentially a mixed mode, in which most farmers participated.

By 1870-1880, alternative markets outside^x of the forestry sector had been established for agricultural products such as butter, cheese and beef. The mixed farmers on the better agricultural lands began to divert the sale of their produce to these outside markets instead of relying totally on the timber trade. The shift for Lanark was not easy, since previously the shanty market had been quite close and the newer markets were now much further away, in Great Britain and the United States.

FOOTNOTES

1. W. Norton, "Agricultural Evolution on the Frontier," The Professional Geographer, 36, No. 1 (1984), pp. 18-19.
2. D.A. Lawr, "The Development of Ontario Farming, 1870-1914: Patterns of Growth and Change," Ontario History, LXIV (1972), pp. 247-250.

APPENDIX A

1841 AND 1861 AGRICULTURAL VARIABLES

1841 AGRICULTURAL VARIABLES

1. Total Land Held
2. Total Land Cleared
3. Bushels of Wheat
4. Bushels of Barley
5. Bushels of Oats
6. Bushels of Peas
7. Bushels of Corn
8. Bushels of Potatoes
9. Number of Cattle (Beef and Dairy)
10. Number of Horses
11. Number of Sheep
12. Number of Hogs

1861 AGRICULTURAL VARIABLES

1. Total Number of Acres Held
2. Number of Acres in Crop
3. Number of Acres in Pasture
4. Acres of Spring Wheat
5. Bushels of Spring Wheat
6. Acres of Winter Wheat
7. Bushels of Winter Wheat
8. Bushels of Barley
9. Bushels of Peas
10. Bushels of Oats
11. Bushels of Corn
12. Bushels of Potatoes
13. Bushels of Turnips
14. Number of Oxen
15. Number of Steers
16. Number of Cows
17. Number of Horses
18. Number of Sheep
19. Number of Hogs

APPENDIX B

AVERAGES AND MEASURES OF DISPERSION

1851/52 and 1871

**1851/52 AGRICULTURAL VARIABLES
MEASURED IN UNITS PER FARM**

**Wheat
(Bushels)
N=234**

Mean	66.92	Std. Error	4.06
Variance	3857.96	Kurtosis	6.45
Range	398.00	Std. Deviation	62.11
Sum	15657.00	Skewness	2.19
Minimum	2.00	Maximum	400.00

**Barley
(Bushels)
N=43**

Mean	15.88	Std. Error	1.62
Variance	112.44	Kurtosis	-.391
Range	39.00	Std. Deviation	10.60
Sum	683.00	Skewness	.86
Minimum	1.00	Maximum	40.00

**Peas
(Bushels)
N=146**

Mean	29.14	Std. Error	2.47
Variance	892.67	Kurtosis	6.14
Range	177.00	Std. Deviation	29.88
Sum	4254.00	Skewness	2.29
Minimum	3.00	Maximum	180.00

**Oats
(Bushels)
N=242**

Mean	117.95	Std. Error	6.60
Variance	10552.71	Kurtosis	4.28
Range	590.00	Std. Deviation	102.73
Sum	28543.00	Skewness	1.84
Minimum	10.00	Maximum	600.00

**Potatoes
(Bushels)
N=256**

Mean 132.99
Variance 13082.09
Range 693.00
Sum 34045.00
Minimum 7.00

Std. Error 7.15
Kurtosis 5.64
Std. Deviation 114.38
Skewness 2.05
Maximum 700.00

**Corn
(Bushels)
N=82**

Mean 19.77
Variance 310.08
Range 97.00
Sum 1621.00
Minimum

Std. Error 1.95
Kurtosis 8.82
Std. Deviation 17.61
Skewness 2.61
Maximum 99.00

**Hay
(Tons)
N=227**

Mean 10.46
Variance 70.45
Range 39.00
Sum 2374.00
Minimum 1.00

Std. Error .56
Kurtosis 1.92
Std. Deviation 8.39
Skewness 1.40
Maximum 40.00

**Wool
(lbs)
N=216**

Mean 37.37
Variance 469.31
Range 95.00
Sum 8071.00
Minimum 4.00

Std. Error 1.47
Kurtosis .07
Std. Deviation 21.66
Skewness .73
Maximum 99.00

**Butter
(lbs)
N=244**

Mean	235.67	Std. Error	12.40
Variance	37534.40	Kurtosis	2.23
Range	993.00	Std. Deviation	193.74
Sum	57503.00	Skewness	1.49
Minimum	5.00	Maximum	998.00

**Cheese
(lbs)
(N=43)**

Mean	77.30	Std. Error	14.88
Variance	9514.03	Kurtosis	19.75
Range	590.00	Std. Deviation	97.54
Sum	3324.00	Skewness	3.98
Minimum	10.00	Maximum	600.00

**Oxen
&
Steers
(N=164)**

Mean	2.67	Std. Error	.11
Variance	1.87	Kurtosis	2.73
Range	7.00	Std. Deviation	1.37
Sum	437.00	Skewness	1.60
Minimum	1.00	Maximum	8.00

**Cows
N=260**

Mean	3.72	Std. Error	.15
Variance	5.44	Kurtosis	13.58
Range	21.00	Std. Deviation	2.33
Sum	968.00	Skewness	2.34
Minimum	1.00	Maximum	22.00

Calves N=238

Mean 4.32
Variance 9.45
Range 17.00
Sum 1028.00
Minimum 1.00

Std. Error .19
Kurtosis 3.74
Std. Deviation 3.07
Skewness 1.71
Maximum 18.00

Horses N=178

Mean 2.46
Variance 1.55
Range 7.00
Sum 438.00
Minimum 1.00

Std. Error .09
Kurtosis 2.45
Std. Deviation 1.25
Skewness 1.24
Maximum 8.00

Sheep N=212

Mean 14.14
Variance 71.68
Range 49.00
Sum 2998.00
Minimum 1.00

Std. Error .58
Kurtosis 1.81
Std. Deviation 8.48
Skewness 1.16
Maximum 50.00

Hogs N=240

Mean 4.98
Variance 15.94
Range 39.00
Sum 1194.00
Minimum 1.00

Std. Error .26
Kurtosis 26.26
Std. Deviation 3.99
Skewness 3.84
Maximum 40.00

1871 AGRICULTURAL VARIABLES
MEASURED IN UNITS PER FARM

Spring
Wheat
(Bushels)
N=327

Mean	59.75	Std. Error	2.82
Variance	2600.89	Kurtosis	10.32
Range	449.00	Std. Deviation	50.99
Sum	19539.00	Skewness	2.20
Minimum	1.00	Maximum	450.00

Winter
Wheat
(Bushels)
N=54

Mean	38.22	Std. Error	4.83
Variance	1260.37	Kurtosis	3.72
Range	152.00	Std. Deviation	35.50
Sum	2064.00	Skewness	2.04
Minimum	8.00	Maximum	160.00

Barley
(Bushels)
N=54

Mean	26.69	Std. Error	3.20
Variance	553.65	Kurtosis	.94
Range	98.00	Std. Deviation	23.53
Sum	1441.00	Skewness	1.20
Minimum	2.00	Maximum	100.00

Oats
(Bushels)
N=354

Mean	115.33	Std. Error	4.69
Variance	7600.19	Kurtosis	1.54
Range	496.00	Std. Deviation	87.18
Sum	39787.00	Skewness	1.19
Minimum	4.00	Maximum	500.00

**Peas
(Bushels)
N=277**

Mean 30.55
Variance 931.99
Range 178.00
Sum 8461.00
Minimum 2.00

Std. Error 1.83
Kurtosis 5.82
Std. Deviation 30.53
Skewness 2.24
Maximum 180.00

**Corn
(Bushels)
N=99**

Mean 13.62
Variance 274.01
Range 98.00
Sum 1348.00
Minimum 1.00

Std. Error 1.66
Kurtosis 13.45
Std. Deviation 16.55
Skewness 3.27
Maximum 99.00

**Potatoes
(Bushels)
N=373**

Mean 117.35
Variance 10416.62
Range 797.00
Sum 43772.00
Minimum 3.00

Std. Error 5.29
Kurtosis 9.92
Std. Deviation 102.06
Skewness 2.59
Maximum 800.00

**Hay
(Tons)
N=369**

Mean 14.82
Variance 122.70
Range 99.00
Sum 5469.00
Minimum 1.00

Std. Error .58
Kurtosis 10.02
Std. Deviation 11.08
Skewness 2.21
Maximum 100.00

Wool
(lbs)
N=332

Mean 54.46
 Variance 1130.19
 Range 246.00
 Sum 18079.00
 Minimum 4.00

Std. Error 1.85
 Kurtosis 6.77
 Std. Deviation 33.62
 Skewness 1.91
 Maximum 250.00

Butter
(lbs)
N=349

Mean 368.21
 Variance 54518.69
 Range 1690.00
 Sum 128505.00
 Minimum 10.00

Std. Error 12.49
 Kurtosis 4.09
 Std. Deviation 233.49
 Skewness 1.46
 Maximum 1700.00

Cheese
(lbs)
N=50

Mean 49.32
 Variance 2195.08
 Range 295.00
 Sum 2466.00
 Minimum 5.00

Std. Error 6.63
 Kurtosis 16.52
 Std. Deviation 46.86
 Skewness 3.51
 Maximum 300.00

Horses
N=317

Mean 2.19
 Variance .87
 Range 6.00
 Sum 696.00
 Minimum 1.00

Std. Error .05
 Kurtosis 3.59
 Std. Deviation .93
 Skewness 1.45
 Maximum 7.00

Oxen
N=33

Mean 1.94
Variance .06
Range 1.00
Sum 64.00
Minimum 1.00

Std. Error .04
Kurtosis 13.74
Std. Deviation .24
Skewness -3.86
Maximum 2.00

Cows
N=341

Mean 5.01
Variance 8.27
Range 19.00
Sum 1707.00
Minimum

Std. Error .16
Kurtosis 2.63
Std. Deviation 2.88
Skewness 1.24
Maximum 20.00

Cattle
N=331

Mean 5.08
Variance 14.05
Range 19.00
Sum 1682.00
Minimum 1.00

Std. Error .21
Kurtosis 1.78
Std. Deviation 3.75
Skewness 1.33
Maximum 20.00

Sheep
N=312

Mean 14.07
Variance 76.89
Range 69.00
Sum 4389.00
Minimum 1.00

Std. Error .49
Kurtosis 6.25
Std. Deviation 8.77
Skewness 1.75
Maximum 70.00

Hogs
N=329

Mean	3.11
Variance	4.39
Range	19.00
Sum	1024.00
Minimum	1.00

Std. Error	.12
Kurtosis	17.98
Std. Deviation	2.09
Skewness	3.21
Maximum	20.00

APPENDIX C

CORRELATION MATRICES OF 1851/52 AND 1871

AGRICULTURAL VARIABLES

APPENDIX D

PRINCIPAL COMPONENTS ANALYSIS OF 1841 AGRICULTURAL VARIABLES

TABLE 1
1841/42 CORRELATION MATRIX

	Wht X ₁	Bar X ₂	Oat X ₃	Pea X ₄	Crn X ₅	Pot X ₆	Ctl X ₇	Hrs X ₈	Shp X ₉	Hgs X ₁₀
Wheat (Wht) X ₁	-	.3079	.5773	.4156	.0817	.6894	.4550	.2148	.4587	.5015
Barley (Bar) X ₂		-	.3595	.3279	.0453	.3553	.3257	.3204	.2964	.2609
Oats (Oat) X ₃			-	.4417	.0554	.6062	.6230	.4108	.5980	.5179
Peas (Pea) X ₄				-	.1189	.4217	.4285	.2159	.4000	.2532
Corn (Crn) X ₅					-	.0535	.0949	.0760	.1359	.1006
Potatoes (Pot) X ₆						-	.5242	.2731	.5105	.5128
Cattle (Ctl) X ₇							-	.4297	.6128	.6018
Horses (Hrs) X ₈								-	.4496	.4204
Sheep (Shp) X ₉									-	.5722
Hogs (Hgs) X ₁₀										-

Source: . Compiled by the author from the 1841 Canada Census, Lanark County.

TABLE 2
1841 PRINCIPAL COMPONENT ANALYSIS

Component	Eigenvalue	Percentage of Variance	Cumulative Percentage
1	4.59	45.9	45.9
2	1.01	10.1	56.0
3	.96	9.6	65.5
4	.86	8.6	74.2
5	.66	6.6	80.8
6	.49	4.9	85.7
7	.43	4.3	90.0
8	.38	3.9	93.9
9	.33	3.3	97.1
10	.29	2.9	100.0

Source: . Compiled by the author from the 1841 Canada Census, Lanark County

TABLE 3				
PRINCIPAL COMPONENTS				
		Component I	Component II	Communality
Wheat	(X ₁)	.8098	.2049	.6978
Barley	(X ₂)	.3120	.3264	.2039
Oats	(X ₃)	.5765	.5422	.6263
Peas	(X ₄)	.4455	.3047	.2912
Corn	(X ₅)	.0527	.1242	.0182
Potatoes	(X ₆)	.7746	.3008	.6905
Cattle	(X ₇)	.4246	.6706	.6299
Horses	(X ₈)	.1153	.6202	.3979
Sheep	(X ₉)	.4029	.6652	.6048
Hogs	(X ₁₀)	.4125	.5766	.5026

Source: Compiled by the author from the 1841 Canada Census, Lanark County

APPENDIX E

PRINCIPAL COMPONENTS ANALYSIS OF
1861 AGRICULTURAL VARIABLES

TABLE I
CORRELATION MATRIX
OF 1961 MONTHLY MEAT, POULTRY, AND LIVESTOCK

	111 x_1	512 x_2	1231 x_3	1232 x_4	1233 x_5	1234 x_6	1235 x_7	1236 x_8	1237 x_9	1238 x_{10}	1239 x_{11}	1240 x_{12}	1241 x_{13}
Meat Fall (x_1)	-												
Meat Spring (x_2)		-											
Meat Summer (x_3)			-										
Meat Winter (x_4)				-									
Meat Spring (x_5)					-								
Meat Summer (x_6)						-							
Meat Winter (x_7)							-						
Meat Spring (x_8)								-					
Meat Summer (x_9)									-				
Meat Winter (x_{10})										-			
Meat Spring (x_{11})											-		
Meat Summer (x_{12})												-	
Meat Winter (x_{13})													-

Source: Compiled by the author from the 1961 Census of Canada, Lunenburg County

TABLE 2			
1861 PRINCIPAL COMPONENT ANALYSIS			
Component	Eigenvalue	Percentage of Variance	Cumulative Percentage
1	4.75	36.5	36.5
2	1.29	10.0	46.5
3	1.11	8.6	55.1
4	.99	7.6	62.7
5	.84	6.4	69.1
6	.80	6.2	75.3
7	.64	5.0	80.3
8	.58	4.5	84.7
9	.48	3.7	88.4
10	.44	3.4	91.8
11	.43	3.3	95.1
12	.36	2.7	97.8
13	.28	2.2	100.0

Source: Compiled by the author from the 1861 Canada Census, Lanark County

TABLE 3

Principal Components

		Component I	Component II	Component III	Component IV
Fall Wheat	(X ₁)	-.0058	.3975	-.1064	.1694
Spring Wheat	(X ₂)	.7906	-.1607	.1370	.6697
Barley	(X ₃)	.3141	.1104	-.0226	.1113
Peas	(X ₄)	.5758	.2639	.1001	.4112
Oats	(X ₅)	.7325	.1375	.1734	.5855
Corn	(X ₆)	.0594	.2202	.0084	.0521
Potatoes	(X ₇)	.4976	.2868	.1195	.3442
Oxen	(X ₈)	-.0029	.1453	-.5251	.2968
Steers	(X ₉)	.4368	.4668	.0524	.4114
Cows	(X ₁₀)	.4628	.5191	.7793	.7134
Horses	(X ₁₁)	.4637	.3045	.5485	.6085
Sheep	(X ₁₂)	.4548	.4847	.3151	.5411
Hogs	(X ₁₃)	.5304	.4468	.2786	.5586

Source: Compiled by the author from the 1861 Canada Census, Lanark County

APPENDIX F

MULTIPLE REGRESSION OF
PERCENTAGE OF CROP AND PASTURE LAND

000 MULTIPLE REGRESSION 0000

Equation Number 1 Dependent Variable.. CROPPED

Beginning Block Number 1. Method: Stepwise

Variable(s) Entered on Step Number 1.. F2

Multiple R	.18182	Analysis of Variance	DF	Sum of Squares	Mean Square
R Square	.03306	Regression	1	1.94052	
Adjusted R Square	.03045	Residual	371	57.34102	
Standard Error	.39314	F =	12.68472	Signif F	.0004

Variables in the Equation					Variables not in the Equation						
Variable	B	SE B	Beta	T	Sig T	Variable	Beta In	Partial	Min Toler	T	Sig T
F2	.003654	.023488	.181825	3.262	.0004	F1	.027376	.077819	.998479	.535	.5928
(Constant)	4.117477	.020167		202.161	.0000	F3	-.037475	-.038223	.995252	-.734	.4623
						F4	-.054927	-.072563	.986479	-1.109	.2681
						F5	-.018046	-.018331	.999944	-.133	.8943

Equation Number 1 Dependent Variable.. PART

Beginning Block Number 1. Method: Stepwise

Variable(s) Entered on Step Number 1.. F2

Multiple R	.23248	Analysis of Variance	DF	Sum of Squares	Mean Square
R Square	.05414	Regression	1	4.90411	
Adjusted R Square	.03160	Residual	377	120.63093	
Standard Error	.56943	F =	31.29253	Signif F	.0000

Variables in the Equation					Variables not in the Equation						
Variable	B	SE B	Beta	T	Sig T	Variable	Beta In	Partial	Min Toler	T	Sig T
2	-.156729	.033945	-.232678	-4.614	.0000	F1	-.011371	-.011684	.999649	-.759	.4490
Constant	3.488024	.029470		118.357	.0000	F3	.119693	.100103	.995632	2.371	.0182
						F4	.055783	.052053	.998793	1.106	.2673
						F5	.009183	.000671	.999805	1.351	.1805

Variable(s) Entered on Step Number 2.. F3

Multiple R	.24127	Analysis of Variance	DF	Sum of Squares	Mean Square
R Square	.04824	Regression	2	8.70490	
Adjusted R Square	.04352	Residual	371	118.87014	
Standard Error	.56592	F =	13.58994	Signif F	.0000

Variables in the Equation					Variables not in the Equation						
Variable	B	SE B	Beta	T	Sig T	Variable	Beta In	Partial	Min Toler	T	Sig T
F2	-.142034	.033810	-.240554	-4.790	.0000	F1	-.022792	-.021405	.984744	-.493	.6215
F3	.094251	.038749	.119093	2.371	.0182	F4	.049498	.051117	.994804	1.064	.2904
(Constant)	3.487691	.029289		119.077	.0000	F5	.004488	.000744	.994374	1.607	.1014

Greening, W.E. "The Lumber Industry in the Ottawa Valley and the American Market in the Nineteenth Century." Ontario History, Vol. LXII, (1970) 134-136.

Guillet, E.C. "Ottawa of Yesterday." Canadian Geographical Journal, XXXIV, (1947), 40-48.

Head, C.G. "An Introduction to the Forest Exploitation in Nineteenth Century Ontario." In J.D. Wood, ed., Perspectives on Landscape and Settlement in Nineteenth Century Ontario, Carleton Library No. 91, (Toronto, 1975), 78-112.

_____. "Nineteenth Century Timbering and Sawlogging in the Ottawa Valley: Documentary Sources and Spatial Patterns." In V. Ivonoffski and S. Campbell, eds., Exploring Our Heritage: The Ottawa Valley Experience, Arnprior and District Historical Society, (Arnprior, 1978), 52-61.

Johnston, R.J. "Principal Component Analysis and Factor Analysis in Geographical Research: Some Problems and Issues." South African Geographical Journal, Vol 59, no. 1, (1977) 30-44.

Jones, R.L. "French Canadian Agriculture in the St. Lawrence Valley 1815-1850." Agricultural History, Vol. 16, no. 1, (1942), 141-148.

_____. "The Agricultural Development of Lower Canada 1850-1867." Agricultural History, Vol. 19, no. 2, (1945), 212-224.

Kelly, K. "The Evaluation of Land for Wheat Cultivation in Early Nineteenth Century Ontario." Ontario History, Vol. LXII, (1970), 57-64.

_____. "Wheat Farming in Simcoe County in Mid-Nineteenth Century." Canadian Geographer, Vol XV, (1971), 95-112.

_____. "Notes on the Type of Mixed Farming Practised in Ontario During the Early Nineteenth Century." Canadian Geographer, Vol. XVII, (1973), 205-219.

_____. "The Impact of Nineteenth Century Agricultural Settlement on the Land." In J.D. Wood, ed., Perspectives on Landscape and Settlement in Nineteenth Century Ontario, Carleton Library No. 91, (Toronto, 1975), 64-77.

BIBLIOGRAPHY

BIBLIOGRAPHY

PRIMARY SOURCE MATERIALS

I Manuscripts

W. Conger. "Tenth Concession of Beckwith Township." Report and Field Notes No. 46, 1817. Dept. of Lands and Forests, Government of Ontario, Toronto.

W. Conger. "Parts of the Townships of Drummond, Beckwith and Bathurst." Report and Field Notes No. 44, 1817. Dept. of Lands and Forests, Government of Ontario, Toronto.

R. Sherwood. "Surveyor's Report of Pakenham Township." Report and Field Notes No. 573, 1823. Dept. of Lands and Forests, Government of Ontario, Toronto.

P.A.C., RG 31, Census of Canada 1841, Bathurst District, Agriculture Schedule, microfilm, C-1344.

P.A.C., RG 31, Census of Canada 1851/52, Canada West, Lanark County, Agriculture Schedule, microfilm, C-11731, C-11732.

P.A.C. RG 31, Census of Canada, 1861, Ontario Census, Lanark County, Agriculture Schedule, microfilm, C-1043.

P.A.C., RG 31, Census of Canada 1871, Lanark County, North and South, Agriculture Schedule, microfilm, C-10017, C-10018, C-10019.

II Newspapers and Cartographic Sources

P.A.C., National Map Collection, NMC 12437, Major G.F. Baron de Rottenburg, "Map of the Principal Communications in Canada West." 1850, Scale of 1:126,720.

P.A.C., National Map Collections, NMC 21920, H.F. Walling, "Map of the Counties of Lanark and Renfrew, Canada West." 1863, Scale of 1 inch to 1.5 miles.

P.A.C., Bathurst Courier, Perth, January 17, 1851, (no. 13) to March 14, 1851 (no. 21), May 2, 1851 (no. 28), to September 26, 1851 (no. 50).

P.A.C., Carleton Place Herald, Carleton Place, March 7, 1851 (no. 24), to August 8, 1851 (no. 46), January 22, 1852 (no. 18), to February 12, 1852 (no. 21).

P.A.C., Canada Farmer, Vol. 1, Nos. 2,6,20,21, Toronto, 1864.

P.A.C., Perth Courier, Perth, March 5, 1870 (no. 23), to June 16, 1870 (no. 38).

SECONDARY SOURCE MATERIALS

III Government Publications

P.A.C., Census of the Canadas, 1851/52, Vol. I, J. Lovell, Quebec, 1853.

P.A.C., "First Report of the Secretary of the Board of Registration and Statistics," Census of the Canadas, 1851/52, J. Lovell, Quebec, 1853.

P.A.C., Census of Canada for 1870/71, Vols. I, II, III, I.B. Taylor, Ottawa, 1873, 1875.

Report of the Commissioners, Ontario Agricultural Commission, C. Blackett Robinson, Toronto, 1881.

Mississippi Valley Conservation Report, Department of Energy and Resource Management, Government of Ontario, Toronto, 1970.

Mississippi Valley Conservation Report, History, Department of Energy and Resource Management, Government of Ontario, Toronto, 1970.

Land Capability for Agriculture, Preliminary Report of Canada Land Inventory, Environment Canada Lands Directorate, Government of Canada, Ministry of Supply and Services, Ottawa, 1976.

Soil Survey of Lanark County, Report No. 40 of Ontario Soil Survey, Canadian Department of Agriculture and the Ontario Department of Agriculture and Food, Guelph, 1967.

IV Theses

Clarke, J. A Geographical Analysis of Colonial Settlement in the Western District of Upper Canada, 1788-1850. Unpublished Ph.d. Thesis, University of Western Ontario, 1970.

Fraser, I.S. The Renfrew Region in the Middle Ottawa Valley. Unpublished M.A. Thesis, Clark University, 1951.

Kelly, K. The Agricultural Geography of Simcoe County, 1820-1880. Unpublished Ph.d. Thesis, University of Toronto, 1968.

Lindsay, V.H. The Perth Military Settlement, Characteristics of its Permanent and Transitory Settlers, 1815-1822. Unpublished M.A. Thesis, Carleton University, 1972.

MacLeod, P.K. A Concentration of Scottish Settlement in Nineteenth Century Ontario. Unpublished M.A. Thesis, Carleton University, 1972.

Norton, W. Rural Land Value and Land Use Patterns in Mid-Nineteenth Century Southern Ontario. Unpublished M.A. Thesis, Queen's University, 1969.

Ray, M. Settlement and Rural Out-Migration in Eastern Ontario, 1783-1956. Unpublished M.A. Thesis, University of Ottawa, 1961.

V Monographs and Books

H. Beldon and Company. Illustrated Atlas of Lanark County, 1880. Reprinted, Owen Sound: Richard, Bond & Wright Ltd., 1972.

Blalock, H.M. Social Statistics. New York: McGraw Hill Inc., 1960.

Bonnycastle, R.H. The Canadas in 1841. Reprinted, New York: Johnson Reprint 1968.

Brown, J. The Sawmills of Lanark and Renfrew. Mallorytown: 1976.

- Chapman, L.J. and D.F. Putnam. The Physiography of Southern Ontario. 2nd ed. Toronto: University of Toronto Press, 1973.
- Chisholm, M. Rural Settlement and Land Use Theory: An Essay in Location. London: Hutchinson University Library, 1968.
- Clark, A.H. Three Centuries and the Island: A Historical Geography of Settlement and Agriculture in Prince Edward Island, Canada. Toronto: University of Toronto Press, 1959.
- Craig, G.M. Upper Canada: The Formative Years, 1784-1841. Toronto: McClelland and Stewart Ltd., 1963.
- Easterbrooke, W.T. and H.G.J. Aitken. Canadian Economic History. Toronto: MacMillan Co., 1965.
- Ezekiel, M. and K.A. Fox. Methods of Correlation and Regression Analysis. New York: John Wiley & Sons Inc., 1959.
- Geike, J.C. Adventures in Canada or Life in the Woods. Philadelphia: Porter & Coates, 1870.
- Guillet, E.C. The Pioneer Farmer and Backwoodsman. 2 vols. Toronto: University of Toronto Press, 1963.
- Harman, H.H. Modern Factor Analysis. Chicago: University of Chicago Press, 1968.
- Harris, R.C. and J. Warkentin. Canada Before Confederation. Toronto: Oxford University Press, 1974.
- Haydon, A. Pioneer Sketches in the District of Bathurst. Toronto: Ryerson Press, 1925.
- Howison, J. Sketches of Upper Canada. Reprinted, New York: Johnson Reprint, 1968.
- Innis, H.A. and A.R.M. Lower. Selected Documents in Canadian Economic History, 1783-1885. Toronto: 1933.
- Johnston, R.J. Multivariate Statistical Analysis in Geography. New York: Longman Inc., 1978.
- Jones, R.L. History of Agriculture in Ontario, 1613-1880. Toronto: University of Toronto Press, 1977.

- Lamond, R. A Narrative of the Rise and Progress of Emigration from the Counties of Lanark and Renfrew to the New Settlements in Upper Canada. Glasgow: 1821.
- Lower, A.R.M. Settlement and the Forest Frontier in Eastern Canada. Toronto: MacMillan Co., 1936.
- Lower, A.R.M. The North American Assault on the Canadian Forest. Toronto: Ryerson Press, 1938.
- Lower, A.R.M. Great Britain's Woodyard: British American Timber Trade, 1763-1867. Montreal & London: McGill-Queen's University Press, 1973.
- McCallum, J. Unequal Beginnings: Agriculture and Economic Development in Quebec and Ontario Until 1870. Toronto: University of Toronto Press, 1980.
- McCuaig, J.D. and E.W. Manning. Agricultural Land Use Change in Canada. Ottawa: Supply and Services, 1982.
- McGiffin, V.R. Pakenham: Ottawa Valley Village. 2 vols., Pakenham: Mississippi Publishers, 1963.
- McGill, J.S. A Pioneer History of the County of Lanark. Toronto: Best Printing, 1968.
- Morgan, W.B. and R.J.C. Munton. Agricultural Geography. London: Methuen & Co. Ltd., 1974.
- Reaman, G.E. A History of Agriculture in Ontario. Toronto: Saunders, 1970.
- Ruddick, J.A. The Dairy Industry in Canada. Toronto: Ryerson Press, 1937.
- Shortt, A. and A. Doughty. Canada and Its Provinces. Toronto: Publishers Association of Canada, 1914.
- Smith, W.H. Canada: Past, Present and Future. 2 vols., Toronto: T. Maclean, 1851.
- Traill, C.P. The Backwoods of Canada. Reprinted, Toronto: Coles, 1971.
- Wynn, G. Timber Colony. Toronto: University of Toronto Press, 1981.

VI Articles

- Brunger, .A.G. "Analysis of Site Factors in Nineteenth Century Ontario Settlement." In W.P. Adams and F.M. Helleiner, eds., International Geography, Vol. 1, 1972, 400-402.
- _____. "Geographical Patterns of Early Settlement: Social Institutions on the Frontier of Upper Canada." Bamberger Geographische Schriften, Bd. 4, (Bamberg, 1982), 267-284.
- Burton, F.W. "Wheat in Canadian History." Canadian Journal of Economic and Political Science, Vol. 3, no. 2, (1937), 210-217.
- Cameron, J.M. "The Role of Shipping from Scottish Ports in Emigration to the Canadas, 1815-1855." In D.H. Akenson, ed., Canadian Papers in Rural History, Vol 11, (Sarnanoque, 1980), 135-154.
- Chapman, L.J. and D.F. Putnam, "The Soils of Eastern Ontario." Scientific Agriculture, Vol. XXII, (1942), 608-636.
- Cross, M. "The Lumber Community of Upper Canada, 1815-67." Ontario History, Vol. LII, (1960), 213-233.
- Clarke, J., H.W. Taylor and W.R. Wightman. "Areal Patterns Population Change in Southern Ontario 1831-1891: Core, Frontier and Intervening Space," Ontario Geography, No. 12, (1978), 27-48.
- Clarke, J. and David Brown. "Focli of Human Activity, Essex County, Ontario, 1825-1852; Archival Sources and Research Strategies." Archivaria, no. 12, (1981), 31-58.
- _____. "Land Prices in Essex County, Ontario 1798 to 1852." Canadian Geographer, Vol. XXVI, (1982), 300-317.
- Fowke, V.C. "An Introduction to Canadian Agriculture." Canadian Journal of Economic and Political Science, Vol. 8, no. 1, (1942), 56-68.
- Gentilcore, R.L. "Change in Settlement in Ontario (Canada) 1800-1850: a correlation analysis of historical source materials." International Geography, Vol 1, 1972, 418-419.

Greening, W.E. "The Lumber Industry in the Ottawa Valley and the American Market in the Nineteenth Century." Ontario History, Vol. LXII, (1970) 134-136.

Guillet, E.C. "Ottawa of Yesterday." Canadian Geographical Journal, XXXIV, (1947), 40-48.

Head, C.G. "An Introduction to the Forest Exploitation in Nineteenth Century Ontario." In J.D. Wood, ed., Perspectives on Landscape and Settlement in Nineteenth Century Ontario, Carleton Library No. 91, (Toronto, 1975), 78-112.

_____. "Nineteenth Century Timbering and Sawlogging in the Ottawa Valley: Documentary Sources and Spatial Patterns." In V. Ivonoffski and S. Campbell, eds., Exploring Our Heritage: The Ottawa Valley Experience, Arnprior and District Historical Society, (Arnprior, 1978), 52-61.

Johnston, R.J. "Principal Component Analysis and Factor Analysis in Geographical Research: Some Problems and Issues." South African Geographical Journal, Vol 59, no. 1, (1977) 30-44.

Jones, R.L. "French Canadian Agriculture in the St. Lawrence Valley 1815-1850." Agricultural History, Vol. 16, no. 1, (1942), 141-148.

_____. "The Agricultural Development of Lower Canada 1850-1867." Agricultural History, Vol. 19, no. 2, (1945), 212-224.

Kelly, K. "The Evaluation of Land for Wheat Cultivation in Early Nineteenth Century Ontario." Ontario History, Vol. LXII, (1970), 57-64.

_____. "Wheat Farming in Simcoe County in Mid-Nineteenth Century." Canadian Geographer, Vol XV, (1971), 95-112.

_____. "Notes on the Type of Mixed Farming Practised in Ontario During the Early Nineteenth Century." Canadian Geographer, Vol. XVII, (1973), 205-219.

_____. "The Impact of Nineteenth Century Agricultural Settlement on the Land." In J.D. Wood, ed., Perspectives on Landscape and Settlement in Nineteenth Century Ontario, Carleton Library No. 91, (Toronto, 1975), 64-77.

- Lawr, D.A. "The Development of Ontario Farming, 1870-1914: Patterns of Growth and Change." Ontario History, Vol. LXIV, (1972), 239-251.
- Lockwood, G.J. "Irish Immigrants and the Critical Years in Eastern Ontario: The Case of Montague Township 1821-1881." In D.H. Akenson, ed., Canadian Papers in Rural History, Vol. IV, (1982), 153-178.
- Lower, A.R.M. "The Assault on the Laurentian Barrier 1850-1870." Canadian Historical Review, Vol. X, (1929), 294-307.
- MacDougall, E.B. "An Analysis of Recent Changes in the Number of Farms in the Northern Part of Central Ontario." Canadian Geographer, Vol. XIV (1970), 125-138.
- Maltby, P.L. "Peter Robinson Emigration of 1823." Ontario History, Vol. LV, (1963), 15-21.
- Marr, W.L. "Tenant vs Owner Occupied Farms in York, Ontario 1871." In D.H. Akenson, ed., Canadian Papers in Rural History, Vol. IV, (1982), 50-71.
- Massy, W.F. "Principal Component Regression in Exploratory Statistical Research." Journal of the American Statistical Association, Vol. 60, (1965), 234-256.
- May, J. "Bush Life in the Ottawa Valley Eighty Years Ago." Ontario Historical Society Papers and Records, Vol. 12 (1913), 153-163.
- McCalla, D. "The Wheat Staple and Upper Canadian Development." Canadian Historical Association Report, (1978), 178-189.
- McInnis, R.M. "Some Pitfalls in the 1851-52 Census of Agriculture of Lower Canada." Histoire sociale/Social History, Vol XIV, no. 27, (1981), 219-311.
- Norton, W. and E.C. Conkling. "Land Use Theory and the Pioneering Economy." Geografiska Annaler, 56B, (1974), 44-56.
- Norton, W. "Agricultural Evolution on the Frontier." The Professional Geographer, Vol. 36, no. 1, (1984), 18-27.

- Pammett, H.T. "Assisted Emigration from Ireland to Upper Canada Under Peter Robinson in 1825." Ontario History, Vol. XXXI, (1936), 178-214.
- Parson, H.E. "An Analysis of Farmland Abandonment Trends: A Study of Central Ontario." Ontario Geography, No. 14, (1979), 41-57.
- Reeds, L.G. "Agricultural Regions of Southern Ontario 1880 and 1951." Economic Geography, Vol. XXXV, No.3 (1959), 219-227.
- Reeds, L.G. "Agricultural Geography: Progress and Prospects." Canadian Geographer, Vol. VIII, (1964), 51-63.
- Richards, J.H.B. "Changing Canadian Frontiers." Canadian Geographer, Vol. V, (1961), 23-29.
- Riddell, J.B. "On Structuring a Migration Model." Geographical Analysis, Vol. 2, (1970), 403-409.
- Rummel, R.J. "Understanding Factor Analysis." Journal of Conflict Resolution, Vol. 40, (1970), 444-479.
- Spragge, G.W. "Colonization Roads in Canada West, 1850-1867." Ontario History, Vol. XLIX, (1957), 1-18.

END

29/06/89

FIN