THE AGRICULTURAL LAND-USE

OF

WALLACE TOWNSHIP

BY

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of the requirements for the degree of
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CHAPTER 1

Introduction

Wallace Township, the northernmost township of Perth County, is an appropriate area for an agricultural land-use study, since the major economic activity after the initial period of settlement has been farming. Lumbering and the sale of forest products were extremely important sources of income in the early pioneer days. But, this activity was a necessity as a means to the desired end. The forest had to be cleared before the land could be farmed. Once the cover of trees was effectively removed, the people of Wallace Township have enjoyed a relatively prosperous existence from farming. Furthermore, all indicators seem to predict that in the forseeable future, agriculture will retain its position as the dominant economic activity of Wallace Township.

The agricultural practices of the township are varied. From personal experience, the author was well aware of this fact and gave much thought as to what the possible reasons for this variety might be. It was decided, following consultation with Dr. L.G. Reeds of the Geography Department at McMaster University, that a study be conducted to discover whether soils were a major factor in determining differences in types of farming. The soil map of Perth County prepared by the Canada Department of Agriculture and the Ontario Agriculture College, and presented in Report

Number 15 of the Ontario Soil Survey[1], shows the varied pattern of distribution of soil types in the township. However, as the field research progressed during the summer months of 1970, the author discovered that type-of-farming on a farm-by-farm basis could not be correlated with soil-type, since this factor was not a dominant one in accounting for differences. The only real pattern which appeared to be evolving was the general tendency of farmers to grow corn on the best-drained land, or on imperfectly-drained soils which had been tiled. As corn is not significantly associated with any particular type of farming practice, it was concluded that soils could not be considered as a major criterion in the distribution of the variety of the types of farms found in Wallace.

The emphasis in this study is on a description and analysis of the five major types of farms found within the township. In the analysis, an attempt will be made to evaluate the significance of the physical and socio-economic factors that influence types of production. Certain clear relationships, such as type of farm and cropping patterns, or size of farm and land use, do occur within the township; these will be identified later in the essay.

Method of Study

Because of time limitations, it was evident that it would have been impossible to interview every farmer in the township in order to obtain a complete description of land use. It was decided to select a sample of farms that hopefully would give an accurate picture of the variations in

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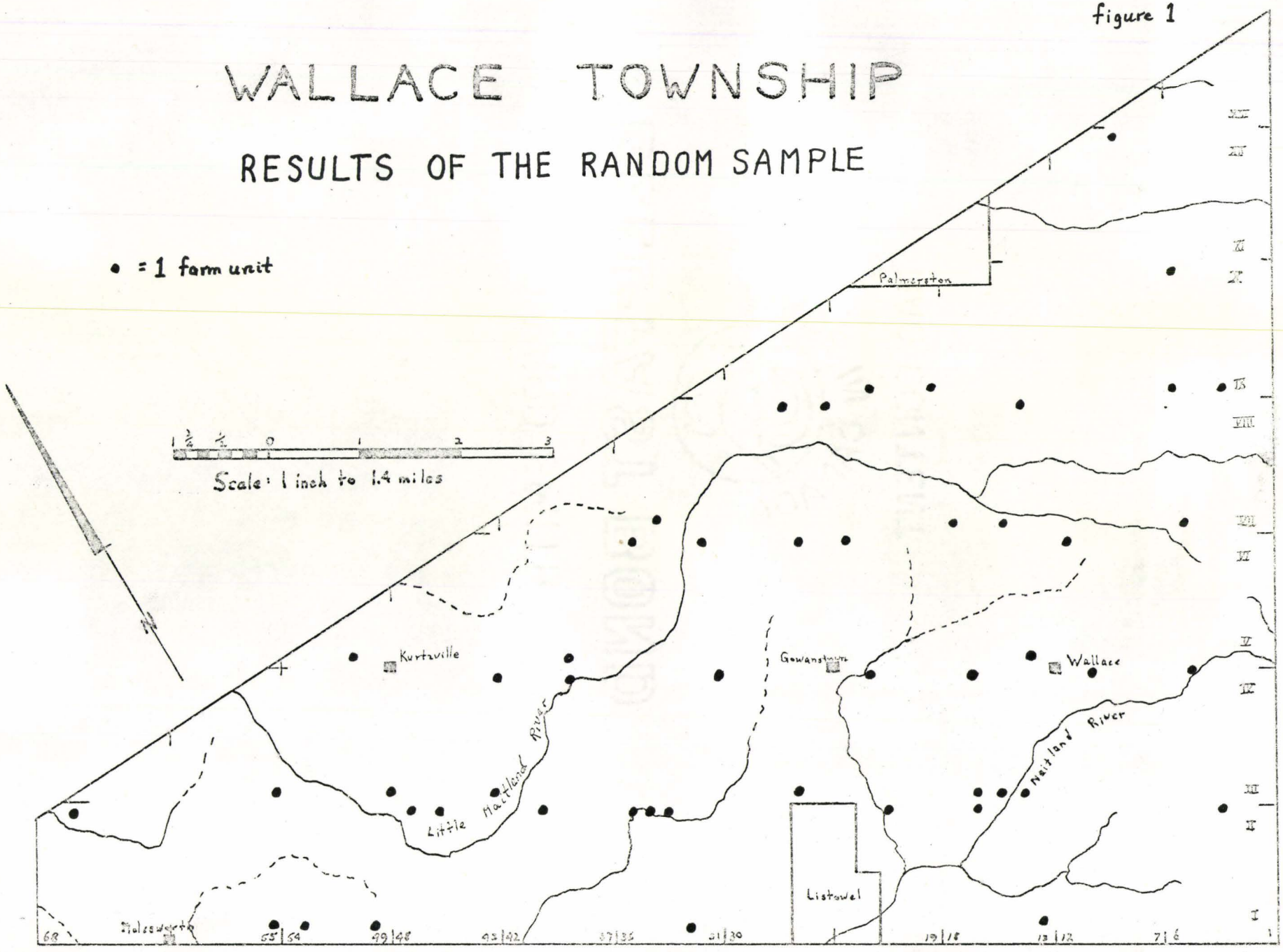
[1]Soil Survey of Perth County, Report No. 15 of the Ontario Soil Survey, Guelph, 1952.

figure 1

WALLACE TOWNSHIP

RESULTS OF THE RANDOM SAMPLE



types of production and land uses. Therefore, a 10% random sample of farm lots was selected and interviews were conducted with forty-seven farmers.

Figure 1, (page 4), shows the location of the farms selected in the random sample. This sample was selected using the table of random numbers presented in the third edition of J.E. Freund's, Modern Elementary Statistics[1], in the following manner.

RANDOM NUMBERS

0	4	2	2	8
6	9	1	4	9
9	0	9	3	6
0	1	2	4	5
1	4	1	4	3

The first two columns were used to represent the concession number, and the next two columns represented the lot number. Thus, from the above selection of random numbers, two farms became part of the total sample: the farm on concession 4, lot 22, and the one on concession 1, lot 24. This process was continued until fifty farms had been selected. Actually, more than fifty pairs of numbers were needed in order to allow for selections that were in urban areas. Concession 1, lot 24, had to be omitted from the sample because this entire lot is within the municipal limits of the town of Listowel. In actuality, upon completion of all of the interviews,

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[1]J.E. Freund, Modern Elementary Statistics, pp. 393-396.

only forty-seven separate farm units had been included. Three of the selected lots were parts of three other farms which had previously been studied. Therefore, all of the inferences made concerning agricultural land utilization in Wallace Township for 1970, are based on the data collected from these forty-seven randomly selected farm units.

Location of Township and Survey Method

"Wallace lies at the extreme northern limit of Perth County, and looks on the map as if it had been added as a matter of expediency rather than from contiguity."[1] The township is peculiarly shaped, being nearly a right-angled triangle with its south-west corner cut off by a boundary line extending for nearly one and one half miles. This triangular shape resulted from the manner in which the original surveys were made in this section of Ontario. In the early days of this portion of Western Ontario, several roads were constructed through the forests, forming governing lines from which townships extended backwards on either side. "The Canada Company and crown lands surveys from the south, from Wellington and Waterloo on the east, and from Lake Huron on the west, all converge on the boundary lines of this triangular township."[2]

The extraordinary shape of the township had posed several severe limitations on both the transportation connections and upon the farmers. Except for the road allowance representing concession 1, (highway no. 86)

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[1]Wm. S. Johnston, History of Perth County, 1825-1902; p. 389.

[2]Ibid., p. 389.

no other concession road joins up perfectly with those of neighbouring townships. Also, none of the sideroads have common intersections with the sideroads of the township to the south and west. Along the 'Wallace Gore Road', which is the boundary road along the north-west side of the township, there are no two farms of exactly the same size or shape. This boundary road cuts diagonally across the survey lines used in the township, and creates a variety of farm sizes, all of which are less than the 100 acre standard used throughout the rest of Wallace. This results in a direct limitation upon the farmers, who prefer to have square or rectangular-shaped fields for todays modern farm machinery, and upon the assessors, who find nearly sixty farms with wider-than-normal road frontages, and lot sizes ranging from ten acres to ninety-five acres.

It would be beneficial at this point, to illustrate the exact survey technique employed to delineate the farm lots within Wallace Township. Originally belonging to the large tract of land known as the Queen's Bush, a survey was finally ordered for Wallace in 1852. At this time, concessions 1, 2, 3, and 4 were completed, with all the land temporarily set aside as common school lands. The remaining 22,900 acres were surveyed by a Mr. Wilkinson and a Mr. P. Callaghan in 1854, one year after Wallace officially became a part of the new county of Perth. "Field notes in the crown lands office indicated a total area of 52,423 acres, with 1,025 acres being reserved for roads."[1] This was the typical procedure in surveying new townships in the middle of the nineteenth century.

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[1]Wm. S. Johnston, op. cit., p. 390.

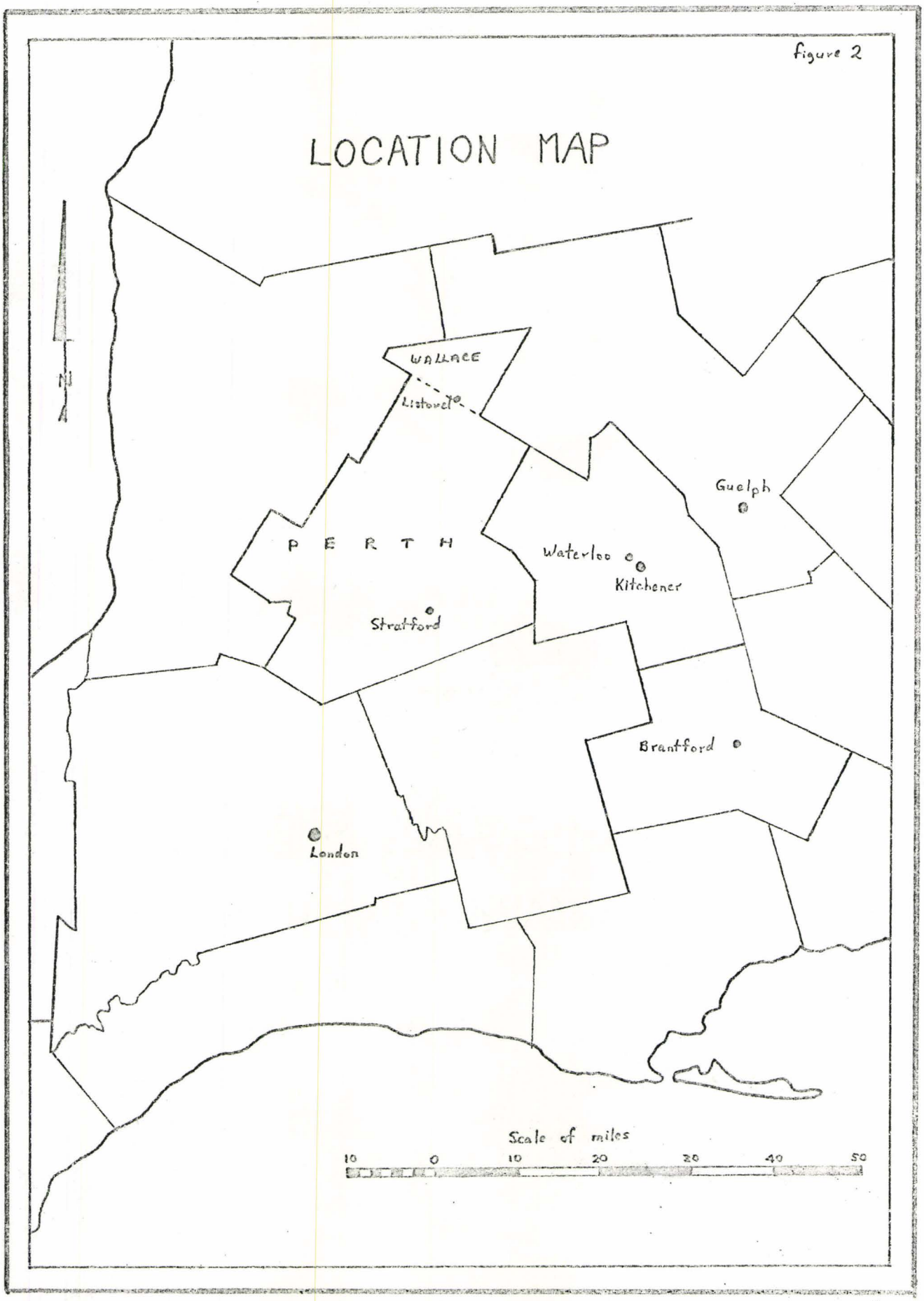
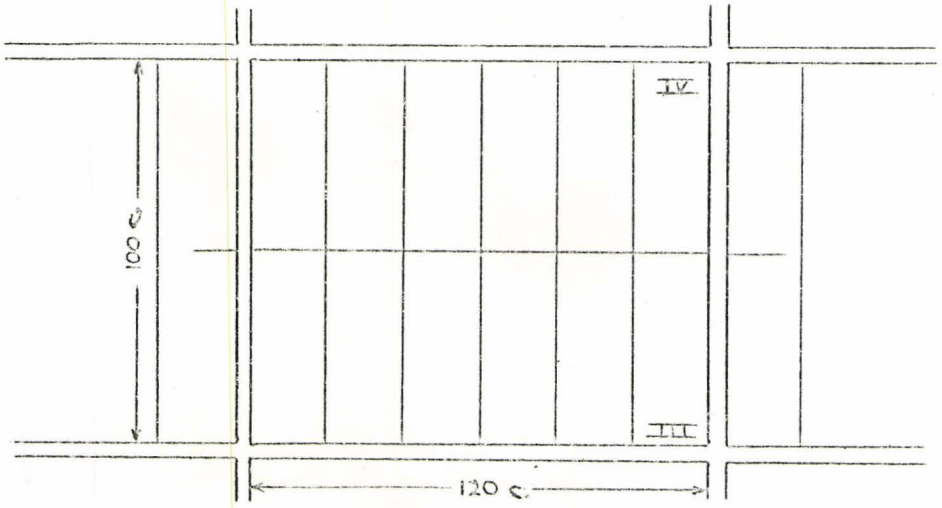


Figure 2
LOCATION MAP
N
WALLACE
Listowel
PERTH
Stratford
Waterloo
Kitchener
Guelph
Brantford
London
Scale of miles
10 0 10 20 30 40 50

The actual surveying technique employed in Wallace has been classified as a "1200 acre section special."[1] This technique apparently was utilized between 1831 and 1855. However, upon careful scrutiny of Plate 99 in the Economic Atlas on Ontario, it was discovered that Wallace was the only township in Ontario which received this special treatment. The following diagram illustrates the principles of a 1200 acre section

FIGURE 3

1200 ACRE SECTION SPECIAL



special. Each block was 120 chains long (7,320 feet or 1.393 miles) and 100 chains wide (6,600 feet or 1.25 miles). This was then subdivided into 12,100 acre lots, each of which was 20 chains wide (0.232 miles) and 50

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[1]Economic Atlas of Ontario, Plate 99.

chains long (0.675 miles). These long, narrow lots, completely covered by forests of maple, elm, and beech, greeted the pioneer when he arrived in Wallace Township. One of the basic characteristics of the land use within the township is a direct result of this survey method, and this will be explained later.

Early Settlement and Agricultural Evolution

The township was officially opened for settlement in 1854, even though a few hardy pioneers had located within the area as early as 1851. The Crown lands office was exceptionally busy at this time in 1854, with the sale of 100 acre lots in the newly opened territory. "Although the sale of lots in Wallace did not start until September of 1854, the entire first concession was sold out before the end of the year."[1] The land boom continued, so that by 1857, the entire township was virtually settled, and the settlers continued to make great headway in the clearing of the land for agricultural purposes.

Settlement continued to progress rapidly in Wallace. The census of 1861 revealed a population of 2,400, and this figure had increased to 3,580 by 1866. Settlers of Irish and Scottish origin had located in the south-west portion of the township. North Irish immigrants had moved into the northern section in the vicinity of Palmerston, while the English had shown a tendency to remain in the south and east. Settlers of West German origin had purchased land in the central and western sections of the township, in the general area of the town of Kurtzville.

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[1] Wm. S. Johnston & H.J.M. Johnston, History of Perth County to 1967, p. 154.

Two important factors aided the rapid growth and occupation of Wallace. The first of these was locational. The proximity of the township to the older, established county of Waterloo definitely aided in attracting experienced pioneers into the area. Waterloo county was the basic source of the German-speaking people of Wallace. The second factor was the arrival of a group of experienced pioneers from the vicinity of Simcoe, near Lake Erie. These people moved north into Wallace in order to join some of their relatives who had immigrated directly from Europe to Wallace Township. Both of these groups of experienced settlers were a valuable asset to the rapid growth of agriculture in the township.

Early agricultural products found a ready market in the local villages of Listowel and Palmerston, and in the expanding towns of Stratford, Berlin (Kitchener), Waterloo, and London. The census of 1861 clearly demonstrates the trends in the early agriculture of the township.

TABLE I[1]

Crops	Acreage
spring wheat	3,112
barley	89
peas	664
oats	881
potatoes	242
turnips	398
TOTAL	5,386 acres

[1]Wm. S. Johnston, op. cit., p. 390.

More than one half of the total acreage was devoted to the production of a staple export crop, while the remainder was used almost exclusively for food production. It was surprising to note that there was no winter wheat grown in Wallace at that time. The early settlers believed that the winters were too long and severe for winter wheat.

After the initial emphasis on wheat, dairying and mixed farming with livestock became important. Milk was required in the nearby villages, and butter and cheese were in demand in the larger towns to the south and east. Numerous small creameries were located in the township, and two cheese factories were in operation before 1890. The early dairying industry was conducted primarily, but not exclusively, on a co-operative basis, whereby a group of dairy farmers would join together, creating for themselves a company, and building a factory to process their milk. One example of such a co-operative enterprise was the "Wallace Cheese and Butter Company". This small co-op was owned by more than eighty farmers[1], each of whom controlled a number of company shares in direct ratio to the original investment he made in the company. The factory which they had constructed on lot 15 of concession 3, was in a central location to the farms. Co-operatives, like the one described, operated very successfully until the 1930's or 1940's when a general lack of capital forced many of them to terminate their operations. However, for nearly half a century, these co-operatives prospered and helped to make dairying the leading agricultural activity both in the township and throughout the county.

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[1]Personal communique from Mr. C.H. Schneider, present owner of Wallace Cheese and Butter.

Nevertheless, mixed farming has been a prominent agricultural practice throughout the history of Wallace. The early emphasis on wheat had completely disappeared before the turn of the century, and the prominence of mixed farming became even more apparent as the dairy co-operative disappeared, thereby creating a situation of near-bankruptcy for many of the owners. New markets were not yet available for the milk and many dairy farmers were therefore forced to either sell their farms to those who were willing to change the type of farming operation, or to attempt this change themselves. In either case, agriculture changed in the township. The absolute number of dairy farms decreased and the relative number of general mixed farms, with an emphasis on livestock production, increased. At present, the emphasis is on livestock, with an ever-increasing specialization in certain types of production.

CHAPTER 2

Physical Basis of Agriculture

Geology

"Geologically, the ancient granite hard shield is only one half of one mile away from the farmlands of Perth County if one measures straight down."[1] At depths of two thousand feet beneath the surface of Wallace the hard rock core of the continent is found. These rocks have only a limited influence on the agriculture of the area. Down warping in the Michigan Basin has created a "general slope to the south and west at an average rate of twenty eight feet per mile,"[2] and thus affects the drainage pattern of the township. Overlying these Pre-Cambrian rocks are younger layers of softer Palaeozoic rocks of Devonian and Silurian origin. These sedimentary rocks are 1,900 to 2,000 feet thick under Wallace and also show a dip towards the south and west.

Map 123A of the Geologic Survey of Canada[3] shows six different types of Palaeozoic rocks beneath the surface of Wallace. These are shown on figure 4, page 14.

In the Pleistocene era, glaciers covered all of Southern Ontario; the last and most important of these being the Wisconsin glaciation.

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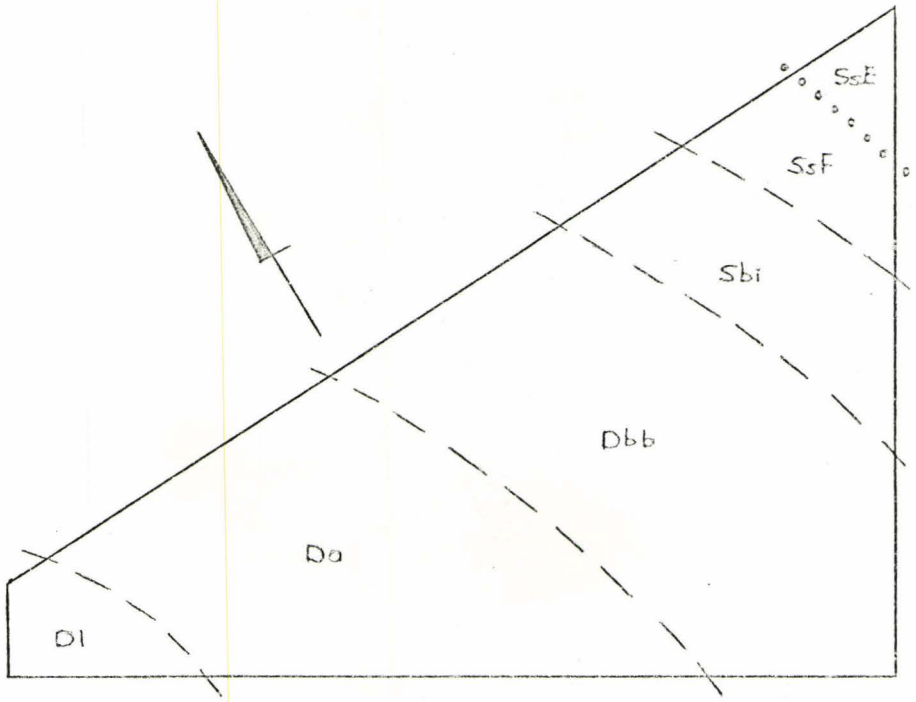
[1] Wm. S. Johnston and H.J.M. Johnston, op. cit., p. 21.

[2] Ibid., p. 21.

[3] Geologic Survey of Canada, Department of Energy, Mines, and Resources, Map 123A: Geology: Toronto-Windsor Area.

FIGURE 4

PALAEOZOIC GEOLOGY OF WALLACE TOWNSHIP



Middle Devonian

(1) Detroit River Group: (a) Dl - Lucas Formation

(b) Da - Amherstburg Formation

Lower Devonian

(a) Dbb - Bass Blanc Formation

Upper Silurian

(a) Sbi - Bass Island Formation

(b) SsE - Salena Formation - E member

(c) SsF - Salina Formation - F member

Wallace Township, where elevations vary between 1,250 feet and 1,350 feet above sea level, is part of the 'Ontario Island', one of the first areas of the province to be permanently exposed when the ice melted some 13,000 year ago. The results of the action of this glaciation were the planing-off of the surface features and the deposition of nearly one hundred feet of limestone till on top of the Palaeozoic bedrock. This unconsolidated overburden and the subsequent deposit of silt are of much greater importance to agriculture than the underlying rock formations.

Physiography

The Wisconsin glaciation is all-important when describing the surface features of Wallace. According to the classification used by L.J. Chapman and D.F. Putnam[1], the eastern two-thirds of the area lies within the Dundalk Till Plain, while the remainder is part of the Teeswater Drumlin Field. The largest portion of the township, therefore, can be described as a "fluted till plain, the flutings running south-eastwards."[2] The topography is smooth to gently rolling or undulating, with some depressional areas which are swampy. Also located on the till plain are a number of small eskers which are aligned in a north-south direction. These knobby, crooked ridges of sand and gravel are valuable as sources of road-building materials, but are very poorly adapted to agriculture.

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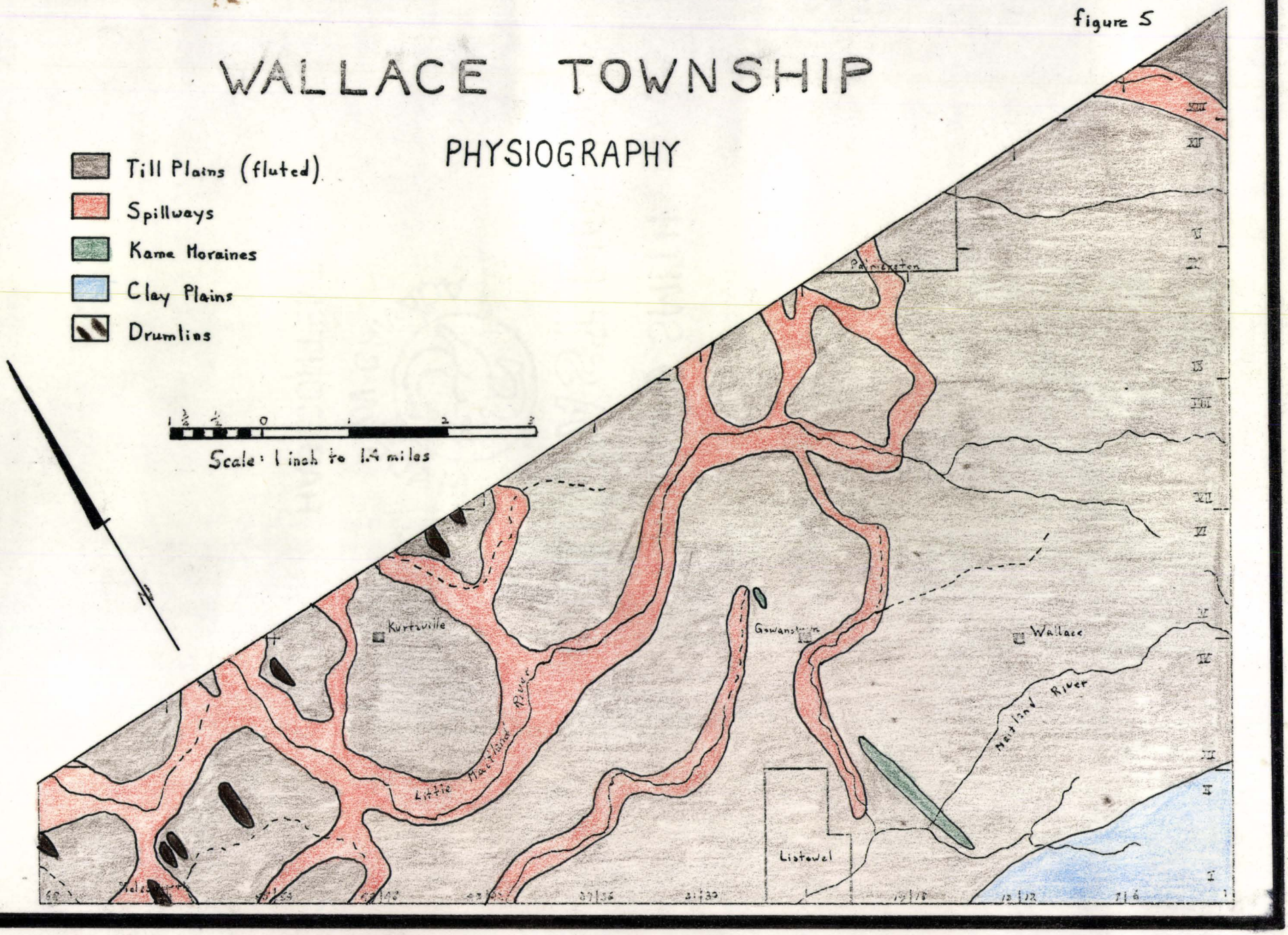
[1] L.J. Chapman, and D.F. Putnam, Physiography of Southern Ontario, map, p. 132.

[2] Ibid., p. 152.

figure 5

WALLACE TOWNSHIP

PHYSIOGRAPHY



The extreme northern end of the township is drained by tributaries of the main branch of the Maitland River. The headwaters of the Middle Maitland and Little Maitland Rivers are located on the till plain in the eastern portion of the area. All three branches of the Maitland flow towards the west, eventually joining near Wingham before emptying into Lake Huron at Goderich. Only the extreme south-eastern corner of the township lies outside of the Maitland Watershed. This small section of land is drained by Spring Creek, a tributary of the Conestogo River and by Black Creek, a tributary of the Nith River. These waters eventually arrive at Lake Erie via the Grand River.

The Teeswater Drumlin Field is represented by a total of five drumlins which are found completely within the boundaries of Wallace and by three others which extend across into the neighbouring townships of Grey and Howick. Glacial spillways are a noticeable feature in this region and several branches of the Little Maitland now occupy these spillways. The soils tend to be thin on the drumlins and are susceptible to erosion unless careful practices are adopted.

Until recently, drainage had been a severe limitation upon agriculture in the township. The major force shaping the landscape in the area since the departure of the glaciers, has been the downcutting of river valleys. In Wallace, this activity has progressed at a very slow rate. The township is generally undissected, and the natural drainage network is insufficient in removing excess water. Consequently, great amounts of time and money have been allocated to the constructing of open ditches and

drains. The township is now criss-crossed by a well developed and highly integrated system of drainage facilities which are capable of adequately removing the excess moisture in early spring.

Climate

Climate, in conjunction with soils, exerts an important influence on the agricultural development of Southern Ontario. Climate determines to a great extent the type of farming that a farmer may practise. Wallace lies within the lower Great Lakes region. It is, therefore, "an area of the major storm tracks of North America and there is usually a regular procession of high-and-low pressure systems moving over the region, from west to east, throughout the year."[1]

The Soil Survey of Perth County uses Chapman and Putnam's climatological classification[2], which places Wallace in the Western Uplands region. Wallace, is therefore, somewhat cooler and wetter than surrounding areas to the east, south and west. The moderating influences of the Great Lakes are not as noticeable in the area as in many other sections of Ontario because of the distance to any of the lakes. A general characterization would be one of cold, snowy winters and warm, dry summers. Table 2, page 20 shows the average temperatures and precipitation for Stratford for a sixty-four year period. Table 3, page 21 presents a comparison of certain general climatic data for the Stratford area and the Wallace

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[1]The Canada Land Inventory, ARDA, Report No. 3, 1966, The Climate of Canada for Agriculture, p. 3.

[2]Putnam, D.F., and Chapman, L.J., "The Climate of Southern Ontario", Sc. Agric., 18.8, April, 1939.

area. The following statistics for the township are interpolated values from plate 58, of the Economic Atlas of Ontario.[1]

1.) frost free days - 126

2.) growing season starts on or about April 19

3.) last occurrence of frost on or about May 15

4.) growing season - 189 to 196 days

5.) snowfall - 100 inches

6.) total precipitation - 36 inches

7.) mean annual moisture deficiency (Thornthwaite) - <1 inch

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[1]Economic Atlas of Ontario, op. cit., plate 58.

TABLE 2[1]

TEMPERATURE AND PRECIPITATION FOR STRATFORD

Month	Temperature (°F)	Precipitation (in.)
December	25	3.42
January	21	3.20
February	20	2.67
WINTER	22	9.27
March	29	2.93
April	42	2.67
May	54	3.08
SPRING	42	8.68
June	64	3.17
July	69	3.36
August	67	3.04
SUMMER	67	9.57
September	61	3.31
October	48	3.29
November	36	3.59
FALL	48	10.19
ANNUAL	45	37.71
May 1 to October 1	63	15.96

[1]Soil Survey of Perth County, op. cit., pp. 17-18.

TABLE 3[1]

CLIMATIC DIFFERENCES IN PERTH COUNTY

	South Slopes	Western Uplands
Mean Annual Precipitation	32 in. to 38 in.	32 in. to 38 in.
Mean Annual Temperature	43° to 45°F.	41° to 44°F.
Length of Growing Season	192 to 198 days	186 to 192 days
Frost Free Period	136 to 142 days	128 to 132 days
Snowfall	50 in. to 90 in.	70 in. to 100 in.

The Climate of Canada for Agriculture reveals further information describing the climate of Wallace. Interpolation from Figure 9[2] of that report, indicates that the northern half of the area has less than 3,000 degree-days above 42°F., while the southern portion receives between 3,000 and 3,250 growing degree-days. "Since 1964 the maturity ratings for corn hybrids, recommended for production in Ontario, has been expressed in terms of "corn heat units", (C.H.U.)".[3] Corn can be grown for grain in areas with 2,500 C.H.U. or more, and corn for silage can be produced in regions with more than 2,100 C.H.U. From Figure 13[4], of this book, Wallace Township has more than 2,500 C.H.U.'s in its southern portion and less than 2,500 in the north.

Wallace Township, therefore, experiences a relatively short growing season, with adequate evenly-distributed precipitation, a heavy

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[1]Soil Survey of Perth County, op. cit., p. 19.

[2]Climates of Canada for Agriculture, map follows p. 8.

[3]Ibid., p. 9.

[4]Ibid., map follows page 10.

winter snowfall, and warm summer temperatures. One of the major problems arising from the climatic conditions occurs in the spring when the rains combine with the melting snow to produce a moisture surplus. However, this difficulty can be overcome by an adequate use of clay drainage tile in the fields, which allows the fields to dry more rapidly, and thereby enabling the farmer to sow his crops one or two weeks earlier than on untiled lands. This tends to lengthen the actual growing season, a benefit to corn growing, and it can also lead to an earlier harvest in August during the driest of the summer months.

The even distribution of rainfall, especially in the early summer, often places severe limitations on the haying operation. "Drought is a problem which rarely worries Perth farmers; they are much more frequently bothered by the problem of getting a hay crop into the mows between June and July showers."[1] Such a situation occurred, unfortunately, for many farmers in Wallace in 1970. This author saw many fields of cut hay that were burned in the fields because the farmers were unable to get all of their crop harvested, as the summer was unusually wet. In the daily cheese production book of Wallace Cheese and Butter, where the author made brief notes about the weather each day during the summer of 1970, eighteen days of weather unfavourable to the cutting, drying, or baling of hay were recorded during the last week of June and the first three weeks of July. Despite these hazards, the climatic regime in the area is excellently suited to the production of small grains and forage crops in the mixed farming-livestock agriculture of Wallace.

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[1] Wm. S. Johnston, and H.J.M. Johnston, op. cit., p. 23.

Soils

Good land use often must rely upon a combination of the farmer's needs and the land's capabilities, and this requires a knowledge of the topography of the land, as well as the qualities and nature of the soil. Most farmers know whether their soils are clay or sand, well- or poorly-drained, but a more scientific designation and description is often necessary. It was, in part, for this reason, that the Soil Survey Series was undertaken in Ontario, and most of what follows in this section originated in Report Number 15 of this series; the Soil Survey of Perth County.[1]

Three major soil types constitute nearly 90% of the soils found in Wallace. Harriston silt loam and Listowel silt loam appear in nearly equal amounts and account for 70% of the soil, while Perth clay loam makes up a further 20%. Eight other soil types exist in small, isolated, and scattered deposits throughout the township. Table 4, which follows, presents a summary of these eight minor soil types, showing the limitations or advantages of each to agriculture.

TABLE 4

MINOR SOIL TYPES OF WALLACE TOWNSHIP

Soil Type	Origin	Characteristics
Huron Clay Loam	subaqueous limestone till	heavy textured, susceptible to erosion, well-drained needs fertilizers
Brookston Clay Loam	subaqueous limestone till	heavy textured, little erosion, poorly-drained, small fertilizer requirements

[1]Soil Survey of Perth County, op. cit., pp. 26-46.

FIGURE 6

SOILS OF WALLACE TOWNSHIP

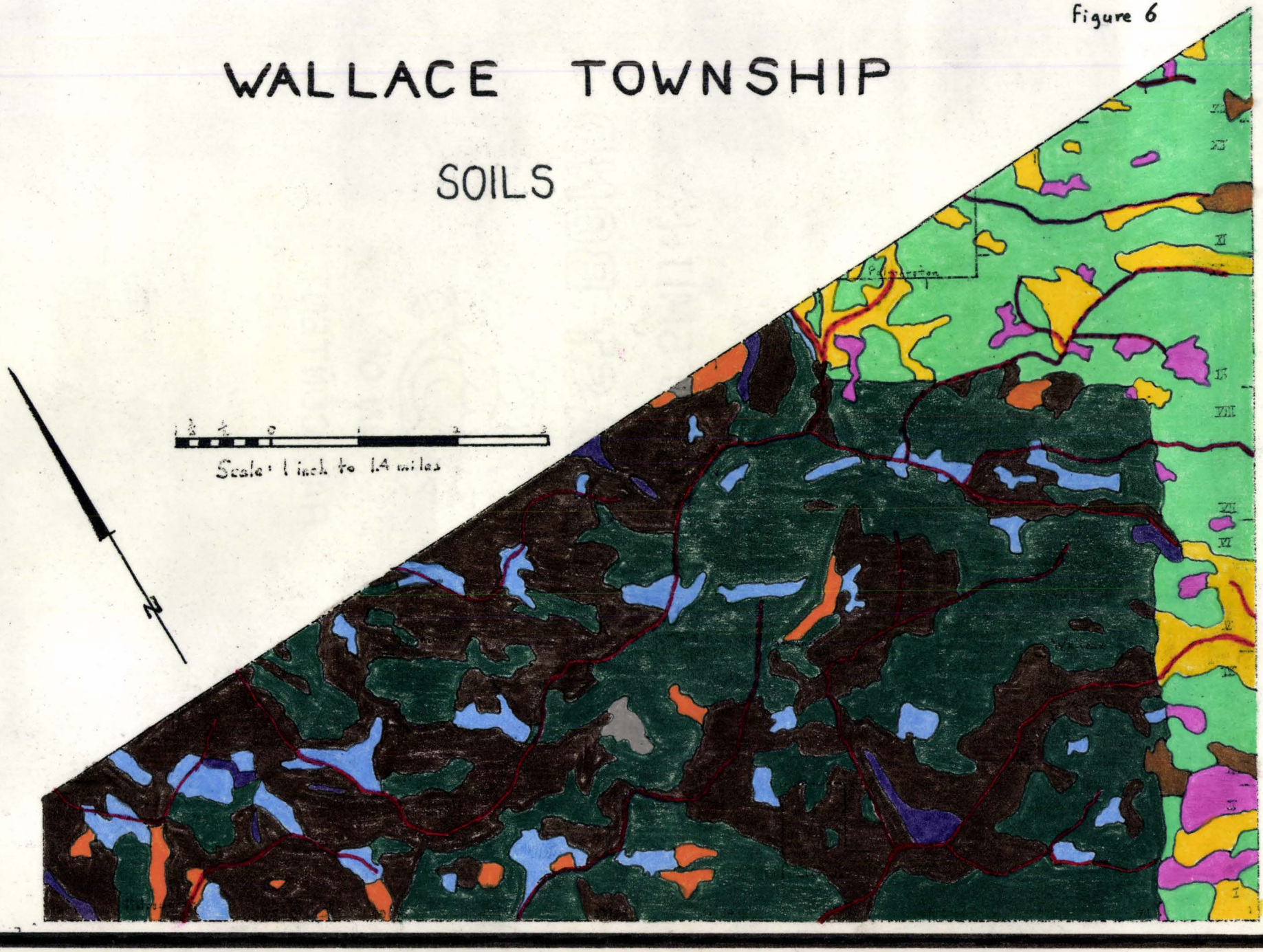
LEGEND

- Harriston Silt Loam
- Listowel Silt Loam
- Parkhill Loam
- Brookston Clay Loam
- Perth Clay Loam
- Huron Clay Loam
- Donnybrook Sandy Loam
- Burford Loam
- Muck
- Bottomland

Figure 6

WALLACE TOWNSHIP

SOILS



Soil Type	Origin	Characteristics
Parkhill Loam	limestone till	medium textured, no erosion, poorly-drained, needs phosphates
Perth Silt Loam	subaqueous limestone till	heavy textured, slight erosion, imperfectly-drained needs phosphates
Burford Loam	well-sorted outwash	rapid internal drainage and percolation, low fertility
Donnybrook Sandy Loam	poorly sorted outwash	occurs on kames or eskers, steeply-sloping, well-drained, extensive erosion, low fertility
Bottomland	alluvial materials	subject to flooding, sand-silt-clay matrix, good natural pasture
Muck	organic materials	depressional areas, very poor drainage, little value

(1) Perth Clay Loam

Although Perth soils are imperfectly-drained, the profile exhibits sufficient Grey-Brown Podzolic characteristics to be included with that group. The topography of the series is smooth, gently sloping and erosion is slight. The tree cover favours the development of a soil in which the humus is well incorporated with the mineral portion. This series supports many different types of farming including dairying, poultry raising, general farming and growing of specialized crops. The soils are well adapted to the growth of oats, hay and pasture, and are fairly well suited for such crops as barley, wheat, corn and clover. Certain specialized crops such as flax, peas, and beans can be grown and will produce good yields.

Drainage improvement is sometimes necessary for satisfactory crop production depending on the crop to be grown. However, depressional areas that exist in conjunction with the gentle slopes make such improvements difficult. The chief fertility needs are organic matter and phosphate. Frequent additions of manures are required if the soils are to remain easily worked.

(2) Harriston Silt Loam

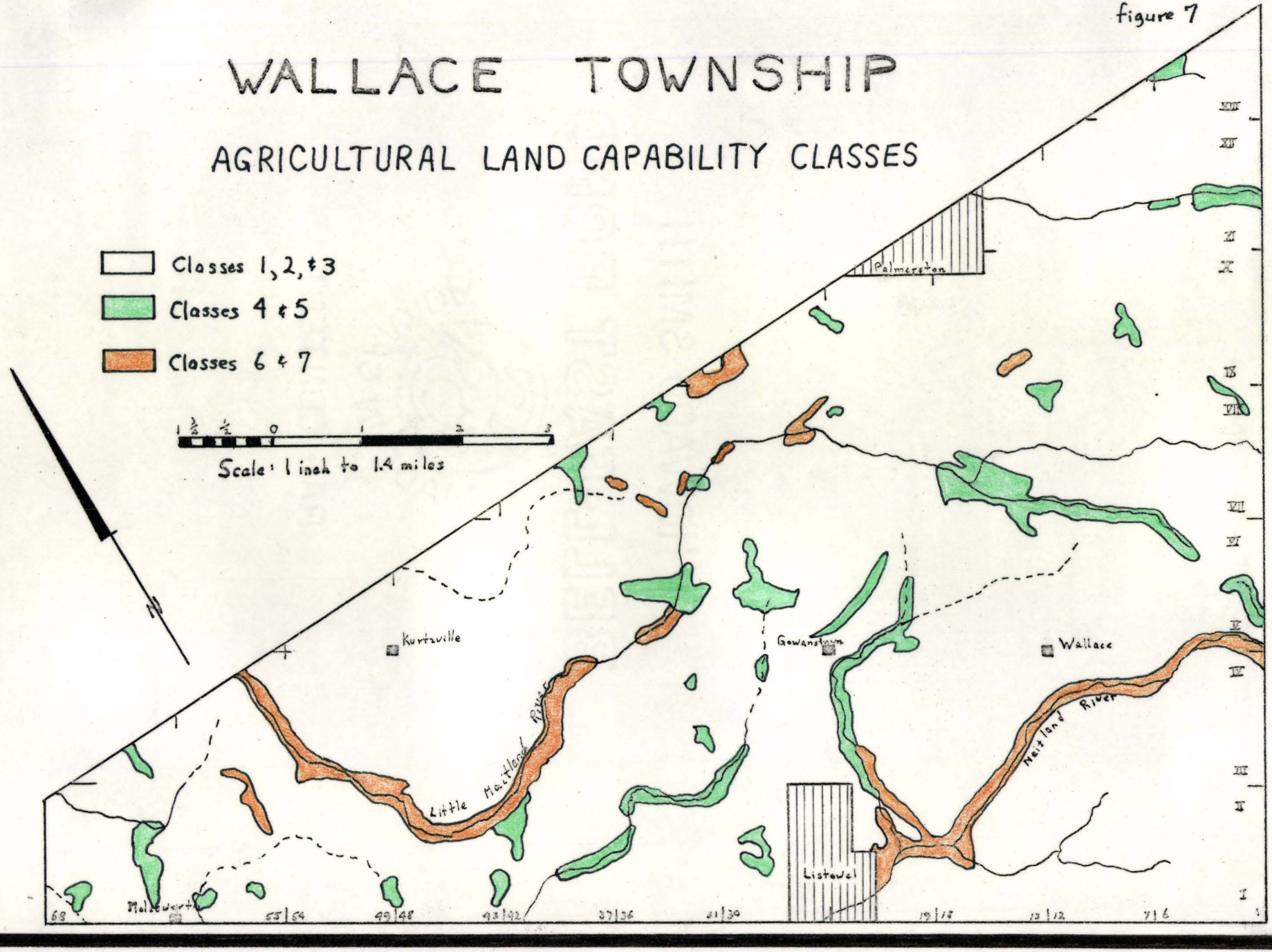
This soil type, a medium-textured, yellowish-brown limestone till, is the well-drained member of the Harriston catena, and belongs to the Grey-Brown Podzolic Great Soil Group. The topography for this silt loam is moderately sloping except along stream courses where slopes are steeper. Erosion is moderate and material drainage is good, runoff being high and internal drainage satisfactory.

A considerable amount of general farming, including dairying and beef raising is practised on the Harriston series. It grows good forage crops of alfalfa, red clover, grasses and sweet clover, and is also well-suited to fall wheat, oats, barley, corn and turnips. Sheet erosion is one of the main hazards to crop production but can be prevented in most areas with the use of long rotation and cover crops. Special practises may be necessary on the steeper slopes to prevent soil loss. In some localities large stones occur in the surface layers and must be removed before the soil can be easily cultivated. The underlying material is lighter than that of the Huron series and allows greater infiltration of moisture permitting earlier spring cultivation. Additions of high phosphate fertilizers along with barnyard manure are required for satisfactory crop yields.

figure 7

WALLACE TOWNSHIP

AGRICULTURAL LAND CAPABILITY CLASSES



(3) Listowel Silt Loam

Listowel silt loam is the imperfectly-drained member of the Harriston catena. The topography is smooth, gently sloping and erosion is slight. The drainage is imperfect consisting of moderate runoff and medium internal drainage. The Listowel soil supports diversified types of farming and in Perth County is used for general farming, dairying and poultry raising. Good yields are obtained from oats, barley, red clover, hay, and pasture, and fair yields are obtained from wheat, corn, flax, and turnips.

Important considerations when farming on Listowel silt loam are drainage and fertility maintenance. The use of tile drains permits the growth of better crops of the soil-building legumes - alfalfa and red clover. The Listowel series is low in phosphates and organic matter. Additions of potassic and phosphate fertilizers and barnyard manures are essential if the soil is to retain a good level of fertility. The Maitland Valley Conservation Report views soils as a determining factor in the methods of working the land, and not as a factor in the type of land use. "Successful farmers have put the information to use in adopting their cropping programmes to the capability of the land by observing the soil and the response of the crop. Many other landowners, however, have failed to recognize the needs of their land or to use the readily available data which would enable them to make their land more productive."[1]

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[1]Ontario Department of Energy, Mines and Resources, "Maitland Valley Conservation Report", chapter 1, p. 9.

CHAPTER 3

Present-Day Agriculture

Social and Economic Factors Affecting Agriculture in Wallace

The character of Wallace Township has remained basically unchanged for the past century. The traditional family farm continues to be the dominant form of land tenure throughout the township. With the aid of various government and affiliated improvement programmes, and the availability of agricultural publications, the levels of production and profits on the family farm are continuing to increase. However, these levels are rapidly approaching their maxima. Several social and economic factors have been influencing agriculture in Wallace in recent years, and will have a profound control over any minor changes in the systems of land-use in the township within the twenty-five years. The number of owner-operated farms may decline, but the types of production should remain similar to the present.

One of the easiest social factors to recognize is the decline in farm population and the accompanying increase in farm-size. In 1966, less than three out of every four persons living in the township[1], were engaged in farm activities, while average farm-size had grown to 138 acres.[2] This increase in farm-size is usually accomplished by the renting or purchasing of land as close to the 'home-farm' as possible. The house

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[1] Census of Canada, 1966.

[2] Ibid.

on this additional land is often rented to people who work in nearby urban centres and prefer to dwell in the country. Consequently, this practice simultaneously creates a decline in farm population and an increase in farm-size. It also creates a decline in the number of actual farm units.

The decline in farm population in Wallace is further aided by the steadily increasing demand for workers in the secondary and tertiary sectors of the economy. The large manufacturing centres of Southern Ontario are luring the young people away from the farms. The cities to the south and east of Wallace offer further attractions for the young people from the rural areas. Very few of those who leave for an education return to the farms. The declining farm population and the reasons for it are not peculiar to Wallace Township. They are typical of much of rural Canada.

Two social trends are influencing the types of farming found within the township. The first of these is the influx of a number of the "New Dutch" farmers into the area. Their numbers are not as great in Wallace as in regions to the north-east, but they are bringing with them a preferred type of farming. The majority of these new residents of Wallace are dairy farmers; the others raise hogs. However, many of those who are involved in dairying do maintain some pigs as a supplement to their dairy income. In the area, as yet, few of the Dutch are shipping fluid milk in the Group I Pool, and they therefore can keep hogs in the

same stable area as the milking herd. These "New Dutch" account, in part, for the large number of "Dairy and Hog" farms contained in the sample of farms. They are also helping to preserve the dairying tradition in Wallace Township.

The second trend can be stated as the personal preference of the farmers. Many of the farmers visited during the summer of 1970 were people who had already reached fifty years of age, and were either unwilling or unable to change their type of farming despite any increase in income which they might be able to obtain. Combined with this is a very strong tendency for a son, who is willing to remain involved in agriculture, to adopt the same style of farming employed by his father. Because a father can no longer give his farm and livestock to his son, the general procedure is for the son to buy a farm of his own, to work in partnership with his father, and to eventually purchase his father's operation. This practice should preserve some of the diversities of farming types in Wallace for, at least, another generation.

The relative prosperity of farming in Wallace Township is primarily the result of the markets afforded by the large urban centres of Southern Ontario. Table 5, (page 33), displays the driving distance to, and the population of some of the metropolitan areas of Southern Ontario.[1] These centres and others, exert a tremendous demand for

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[1]Warkentin, J., Canada: A Geographical Interpretation, p. 389.

agricultural products of all kinds. Particularly important to Wallace is the need for milk, dairy products and meat. With a provincial population of 6,960,870[1] in 1966, and an even larger one now, Wallace is not, and will not be producing for a restricted market.

TABLE 5

DISTANCE TO AND POPULATION OF SELECTED ONTARIO METROPOLITAN AREAS

Centre	Distance from Listowel	Population
Toronto	100 miles	2,066,000*
Hamilton	75 miles	482,000*
London	60 miles	196,000*
Kitchener-Waterloo	35 miles	170,000*
Guelph	40 miles	60,000
Stratford	30 miles	35,000

*see footnote 1, previous page

The Kitchener-Waterloo area plays a special role in the agricultural production of Wallace. The large and numerous meat packing establishments in these two cities continually need substantial numbers of all types of livestock. The farmers of Wallace and Perth produce for these packing houses. The proximity of the market explains the success of the numerous small-scale producers of Perth and Wallace. Of the 3,808 farms in Perth County in 1966, 2,434 of them were engaged in pig production at an average

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[1]Census of Canada, 1966.

of 70 pigs per farm.[1] Table 6, (following), shows livestock and poultry production figures for Perth and Wallace for 1966.[2] Perth is ranked in comparison to all other counties in Ontario, while Wallace is ranked comparatively to the eleven townships in Perth County.

TABLE 6

LIVESTOCK AND POULTRY PRODUCTION FOR PERTH AND WALLACE, 1966

	Total Cattle	(r)*	Milk Cows	(r)	Pigs	(r)	Total Hens	(r)	Chickens & Pullets	(r)
Perth	160,329	4	50,139	1	170,976	1	1,532,722	4	479,168	3
Wallace	17,626	3	5,125	3	17,536	3	246,397	2	36,335	6

*r indicates the rank

Without adequate transportation facilities, much of the production of the township would not reach the markets. Accordingly, an excellent network of paved highways and county roads provide Wallace with adequate accessibility not only to the Kitchener-Waterloo region, but also, to the rest of Southern Ontario. Alan Johnstone Milk Transport, which is based in Listowel, has a fleet of more than thirty bulk-tank trucks moving the milk produced in Wallace and surrounding areas to the depots of the United Dairy and Poultry Cooperatives in Guelph and Toronto. Several small livestock trucking companies are located in the area, and serve Wallace Township. Pigs and cattle from the township are trucked regularly to the weekly auction sales at the Brussels Stockyards, the Listowel Livestock Sales Barn, and to the larger sales in both Kitchener and Waterloo.

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[1] Census of Canada, 1966.

[2] Ibid.

Two other minor economic factors affect agriculture in the township. The Campbell Soup Company Limited, has had its frozen food plant in operation in Listowel for more than ten years, and its demand for chickens and turkeys has encouraged the production of poultry in Wallace. The psychology of locating a food plant in a rural area where production is flexible is verified by the fact that nearly one-sixth of all hens produced in Perth County in 1966, were raised in Wallace. In 1951, Wallace had less than one-eighth of the total county production. The second factor is the Ontario Milk Marketing Board, (O.M.M.B.), which controls the sale and shipment of all milk produced in the Province of Ontario. The strict enforcement of production quotas and other regulations by the O.M.M.B. has not won favour with the dairy farmers. The author talked to many dissatisfied dairy farmers during the summer of 1970. Many of these people stated clearly that, if the situation with respect to the O.M.M.B. and milk quotas had not been improved by the end of 1971, they would seriously think of selling their dairy herds and their milk quotas, and shifting to beef production. As yet, the situation for the dairy farmers remains unchanged from the summer of 1970, even though the Group I Pool producers will be receiving a price increase of 20¢ per hundredweight, effective in February 1971. Unless the farmers alter their attitude toward the O.M.M.B., a gradual decline in the importance of dairy farming could be expected for Wallace Township.

Government policy remains as an intangible factor influencing agriculture. Unforeseen large-scale reforms and/or incentives in the dairy, beef, or hog sectors of agriculture, implemented by either the federal or provincial government, would create a situation inviting change in the land-use of Wallace. The majority of the farmers interviewed felt that they would be able to earn a decent living from their present operations as long as the government did not interfere. They sincerely believed that meddling by the government often produced more adverse effects than benefits. This opinion is contrary to that of many rural planners. Numerous farmers in Wallace are using the land in a way that they prefer, and these people would not tolerate someone directly forcing them to change. Looked at as a single factor, an absence of government intervention will enable the types of agriculture found in Wallace to persist for many years.

Recent Trends in Wallace, Perth, and Ontario

The data used for the following discussions and for Figures 8 to 13, (pages 48 to 51), was obtained from the Census of Canada, 1951, 1956, 1961, and 1966.[1] This information is included in this report in order to present a description of the changes that have occurred within Ontario. It also enables one to determine whether Perth and Wallace are exhibiting similar or different trends when compared to the province. Percentages have been used to facilitate comparison of the three different scales.

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[1]Census of Canada, 1951, 1956, 1961, and 1966.

(1) Total Area in Farms

The provincial trend in the past twenty years has been towards a steady decline in the amount of land used for agriculture. Although much new land has been opened up for use, there has been a decrease of slightly more than three million acres of farm-land since 1951. This is equivalent to a decline from 9.8% to 8.1% of the total land area. This trend is much weaker in Wallace and in Perth. The decline in the total acreage of farm-land in the county is a mere 1%. This decline has not been steady as the 1961 percentage is higher than the one for 1956. A similar situation has occurred in Wallace. An overall decline of 2.2% (1,166 acres) has been of a fluctuating nature, due to an increase in farm-land acreage in 1961.

There appear to be two factors explaining the variation in trends between the province, the township, and the county. Urban encroachment, competition for land, and the associated effects of urban sprawl show up clearly in the provincial decline. However, the acquisition of agricultural land for urban uses is not occurring to any great extent in Perth County. Annexations by the city of Stratford and by the three larger towns of St. Mary's, Mitchell, and Listowel has been almost negligible. Highway widening projects between 1961 and 1966 account for most of the decline in Wallace. The second factor involves the abandonment of marginal and sub-marginal farm-land. This is not happening in Perth or Wallace because there is very little poor land in the region. Wallace Township is almost completely class 1 land, while the rest of the county is a mixture of classes 1, 2, and 3.[1] All of this land is well-suited to agriculture, is highly productive, and can be used profitably.

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[1]Canada Land Inventory, ARDA, Soil Capability for Agriculture; map, Kitchener 40 P-O.

(2) Improved Land

Improved land has been calculated as a percentage of total farm-land rather than total area, in order to present a more accurate picture of the nature of the actual land used for farming. For the province, as a whole, the percentage of improved farm-land has shown a steady increase since 1951, while the total acreage of improved land has actually decreased. Nevertheless, the provincial percentage remains much lower than the county and township figures. In 1951, 90% of all farm-land in Perth, and 85% of the farm-land in Wallace was improved land; and these figures have shown very small increases in the past twenty years.

(3) Size of Farms

The average size of the farm unit has steadily increased since 1951. A look at the percentages of the various size classes gives an indication of how this increase may have evolved. The same dominant trends are evident at all three levels - provincial, county, and township. No apparent changes have occurred in the relative numbers of farms in the following size categories: (i) less than 10 acres, (ii) 10 acres to 69 acres, and (iii) 130 acres to 179 acres. The percentage of farms of sizes ranging from 70 acres to 129 acres has shown a marked decline, while farms larger than 180 acres have shown a comparatively strong increase. The predominance of the 100 acre farm lot is characteristic of the survey pattern of most of the townships in Southern Ontario, and is a likely explanation for the above-mentioned increase and decrease. The acquisition of one of these lots by a farmer intent on expanding his operation would

immediately increase his farm-size from the smaller category, (i.e., 100 acres), to the larger category, (i.e., 200 acres). Another interesting aspect in the distribution of farm sizes, is that there is a much higher percentage of farms in the 70 acres to 129 acres class in Wallace and Perth than for the province. The basic reason for this is the larger number of owner-operated farm units in Perth and Wallace. Only one of the forty-seven farms in the sample was being operated by a non-owner. It was previously stated that the family farm is still the basic farm unit in Wallace. The same is true for Perth County. The general tendency is for family-operated farms to be smaller than the manager-operated farms which are more numerous in other sections of Ontario. It should also be mentioned that the increase in farm-size, has been accompanied by a decrease in the number of farm units.

(4) Acreages Devoted to Specific Crops

Wheat production is now a very minor aspect of land-use in Ontario. The acreage devoted to wheat has been decreasing continually, to the point where the crop occupied a mere 2% of the total farm-land in 1966. Wheat has been of even less significance to Perth and Wallace in recent years. In 1966, only 231 acres of wheat were grown in the township; a figure representing less than 0.5% of the total farm-land in Wallace.

Oats have experienced the same type of decline as wheat. In 1961, oats were occupying 10% of the farm-land at all three regional scales, but by 1966, this figure had been reduced to 2.1% for Wallace, 4.4% for Perth and 6.8% for Ontario. The fact that very little land in Wallace is used for cash crops, explains the lower percentage for the township.

In contrast to the two crops listed above, barley acreage has been expanding. As barley is increasingly being used as a feed for hogs, the large number of hogs produced annually in Perth and Wallace necessitate a sizeable barley production. In 1966, Perth was the second largest producer of barley among all counties in Ontario.

Perth and Wallace are leaders in the use of land for the production of mixed grains. Twenty-five percent, (25%) of the farm-land in the township and 22% of the farm-land in the county were used for this purpose in 1966. The trend for these two areas is towards an increasing yearly production of mixed grains for use as a livestock feed. In the province, the acreage devoted to mixed grains has remained relatively constant since 1951. In 1966, Perth, the largest grower of mixed grains, produced more than 13% of all mixed grains in the province.

The decline of wheat and oats can be partially attributed to the increasing use of corn as a livestock feed. Between 1961 and 1966, acreages in fodder corn in Ontario more than doubled from 3.4% of total farm-land to 9.4%. In the same period, fodder corn acreage in Wallace increased from 2.2% to 4.8% of total farm-land, thereby making it the third most important crop in the township. This is even more striking when one realizes that corn was first introduced to Wallace Township in the early 1950's. There can be no doubt that the increased use of corn results from the development of the hybrid varieties. Hybrid corn for fodder purposes, is climatically adaptable to Wallace Township. As more farmers become willing to make the necessary expenditures for a silo and other special implements, corn should maintain its increasing popularity as a livestock feed, and consequently should be grown on a larger percentage of the farm-land.

With the increased acreage of corn accounting for the decline in wheat and oats, one would expect that the acreage in tame hay would have remained relatively constant. This is, in fact, true for Perth and Ontario. In the province, 17% to 18% of the total farm-land has been devoted to hay for the past twenty years, while the county had 21%. There have been very minor fluctuations in these two figures, but this can be attributed mainly to the yearly variations on a farm-by-farm basis, where crop rotations always produce slight differences from year-to-year. However, crop rotation does not appear to be sufficient to explain the trend in hay production for Wallace Township. The acreage devoted to hay has shown a slight, but steady increase from 20.7% in 1951, to 22.8% in 1966. This is, in part, the result of the growing emphasis on livestock production in the township.

Field Results, 1970

The data collected during the summer of 1970 coincides satisfactorily when compared to similar statistics obtained from the 1966 Census of Canada. This result is actually surprising when one considers the method of obtaining the final figures for each farm unit. In nearly all cases, the acreages given by a farmer for his various crops, when added, were less than the actual size of the farm. The farmers were quite surprised and annoyed by this result, especially where the error amounted to ten or more acres. The farmer tried to make up the difference by saying that there might be another acre or two in the front field, or the bush might be a bit larger. Generally, these statements were acknowledged,

but not actually used in correcting the errors. The author felt that he should arbitrarily decide upon a method of distributing the required acreage for any farm among the various land-uses on that farm. This was accomplished by dividing this acreage equally among all crop-land, pasture-land, wood-land, and waste-land. Fractions were avoided by allotting the extra acreage to fields or crops where the farmer thought there might be more than what he originally thought. The author felt justified in doing this, because it was apparent that all farmers tended to underestimate the size of at least one of their fields. Table 7, presented on page 43 gives a comparison of the 1966 census data for Wallace and the 1970 field data. Table 8, (page 52 to page 53), presents a summary of the actual data collected during the summer months of 1970.

TABLE 7

WALLACE TOWNSHIP: COMPARISON OF 1966 CENSUS DATA AND 1970 DATA

Item	1966	1970
Number of Farms	369	346*
Average Size of Farms	137.8 acres	157 acres
less than 10 acres	2.4%**	0.0%
10-69 acres	13.8%	4.26%
70-129 acres	42.0%	46.81%
130-179 acres	16.5%	10.64%
greater than 180 acres	25.2%	38.29%
Improved land	86.4%***	86.7%
Wheat	0.5%	0.7%
Oats	2.1%	0.5%
Barley	2.7%	4.15%
Mixed Grains	24.2%	23.40%
Seed Corn	0.7%	1.75%
Fodder Corn	4.8%	11.20%
Tame Hay	22.8%	22.10%
Pasture	25.2%	19.11%
Woodland	8.12%	10.82%
Wasteland	5.42%	2.48%

* The 47 farms represented 13.8% of the expected farm-land area of the township for 1970.

Therefore: $47 \times \frac{100}{13.8} = 346$ farms

** Percentage of the total number of farms.

*** Percentage of the total farm acreage.

It is interesting to notice that all of the major trends discussed in the preceding section have appeared in 1970. For example, corn and barley acreages have shown further remarkable increases, while oats and wheat have declined. The only major discrepancies occur in the figure for pasture-land, and for farms of sizes varying from ten to sixty-nine acres. The rapid decline of pasture could result from an error in the sampling technique or from a definite change in land-use. The land-use change could result from the expansion of the large-scale beef operations where increased acreages of corn are grown to replace pasture as a food source. The relative absence of farms in the ten to sixty-nine acre category can be attributed to the method of sampling farms. No allowance was made for surveying two farms located in the same lot. The author is aware of the fact that along many of the sideroads in the township, the lots have been subdivided into a north half and a south half. It was decided that where it was possible, only the farm facing the concession road would be surveyed. By employing this technique, many of the fifty acre farms located on the sideroads were overlooked. If four or five of these smaller farms had been included, the figure obtained for the average size of a farm unit would have been decreased to approximately 145 acres. This would represent a smaller increase; one that was more consistent with increases in the past twenty years.

It was stated previously that drainage was a major limitation on agriculture in Wallace Township. Accordingly, the author asked each farmer if his land was drained artificially in any way. It was found that underground tile drains are employed extensively throughout the area.

Even some of the farms on the best-drained soils - the Harriston silt loam - had been tiled. On the forty-seven farms visited, eighteen were completely tiled, nineteen were partially tiled, and only ten farms had little or no tile. Another method of aiding the natural drainage is the construction of open ditches. Wallace has a very intricate network of these ditches to assist the rivers in removing excess water in the spring. While only seventeen of the forty-seven farms reported the presence of ditches, fifteen of these farms were not drained by a river. A further fourteen farms are located in the western portion of the township where the dominant soil type is the well-drained Harriston silt loam. The remaining sixteen farms reported natural river drainage and no open ditches.

In analyzing the drainage problems, the crop adaptability ratings as presented in the Soil Survey Report[1] deserve some consideration. Harriston silt loam and Huron clay loam are rated good for all the crops, except corn, which are grown in Wallace under natural drainage conditions. For these two soils and for Burford loam, corn is only rated at good-to-fair, but this is the best rating for any naturally-drained soil in the township. Of the twenty-three farms reporting corn, twenty-one of them had some land of one or all of these three types of soil. The only two farms which produced corn on different soil-types, both had well-tiled Listowel silt loam, which merits a good rating for corn when artificially drained. A definite relationship seems to exist, therefore, between corn production and the existence of the best rated soils. Unfortunately,

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[1]Soil Survey Report no. 15; op. cit., pp. 58-62.

corn is the only crop with which it is feasible to search for such a relationship. Of the two leading crops, the tame hay is usually a mixture of alfalfa, clover, and timothy; each of which has different adaptability ratings for different soils. Also, the 1,600 acres of mixed grains cannot be tested for relationships to soils for the same reason.

An attempt was also made to determine the extent of any actual land-use changes for the 1971 crop-year. This was accomplished by recording the acreages that a farmer had seeded-down into hay, and the acreage of grass that he intended to plough for use for corn or grain. The results of this effort are inconclusive, as only seventeen farmers reported the amount of land seeded-down and the amount that they hoped to plough in the fall. A further four farms reported some seeding-down, but gave no indication whether or not they would be ploughing any grass-land. A total of 310 acres was seeded down on all twenty-one farms, and 260 acres were going to be ploughed on the seventeen farms. Even if the other four farmers do no ploughing at all, the extra fifty acres of hay in the 1971 crop-year represent a maximum increase of less than 0.75%. This would raise the total acreage of tame hay to exactly the same level as was recorded in 1966, (i.e., 22.8%).

However, corn acreage can still increase slightly within the given framework of ploughed grass-land. On the seventeen farms reporting ploughed grass-land, the farmers who were already growing corn only expressed the desire to produce more corn in coming years. They were unable, at the time of the interviews, to predict the amount of this increase.

Therefore, a maximum percentage increase for corn for 1971 would be less than 30%, (i.e. 260 acres), if all the ploughed grass-land were used for corn. This is unreasonable, and a more likely figure would fall in the 5% to 10% range, (i.e. 40 acres to 80 acres). On this basis, the author feels safe in concluding that no significant changes in crop acreages will occur in 1971.

The trends depicted by the census data have re-appeared in the 1970 statistics. The increasing demand in Ontario for fresh meat is still guiding agriculture in Wallace. This is verified by the fact that all but four of the forty-seven farms in the sample could be classified as dairy, dairy and hogs, beef, beef and hogs, or hogs specialty. One now has to explore the characteristics and associated land-uses of each of these types of farms.

Figure 8

TOTAL POPULATION ON FARMS

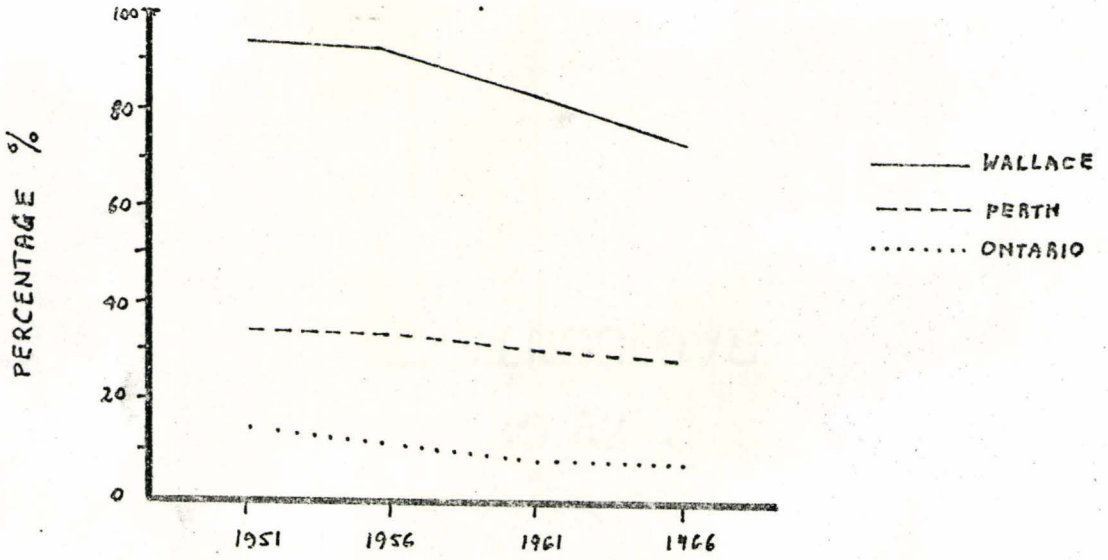

Figure 9

TOTAL AREA IN FARMS

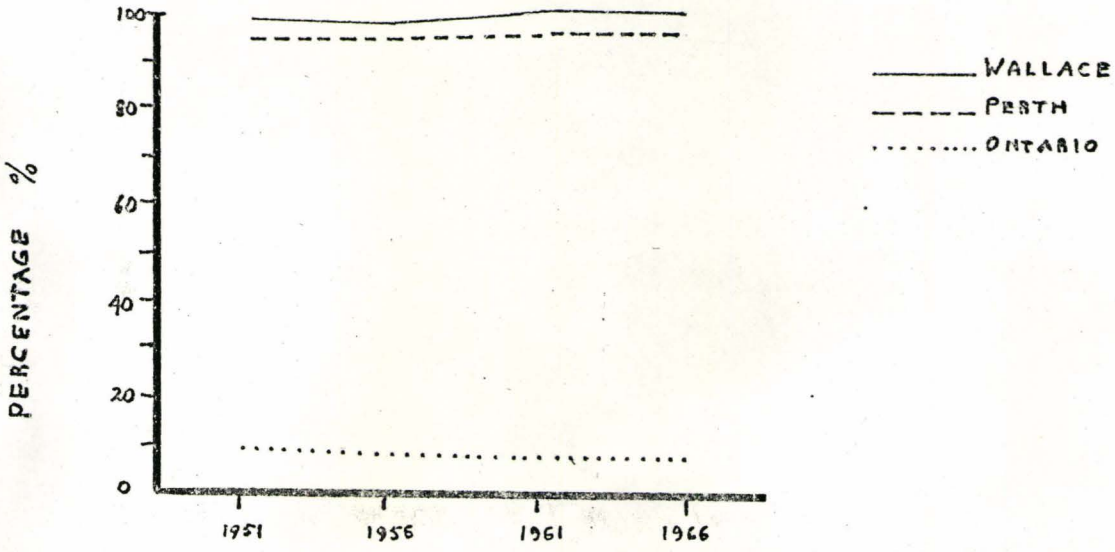

Figure 10

AVERAGE SIZE OF FARMS

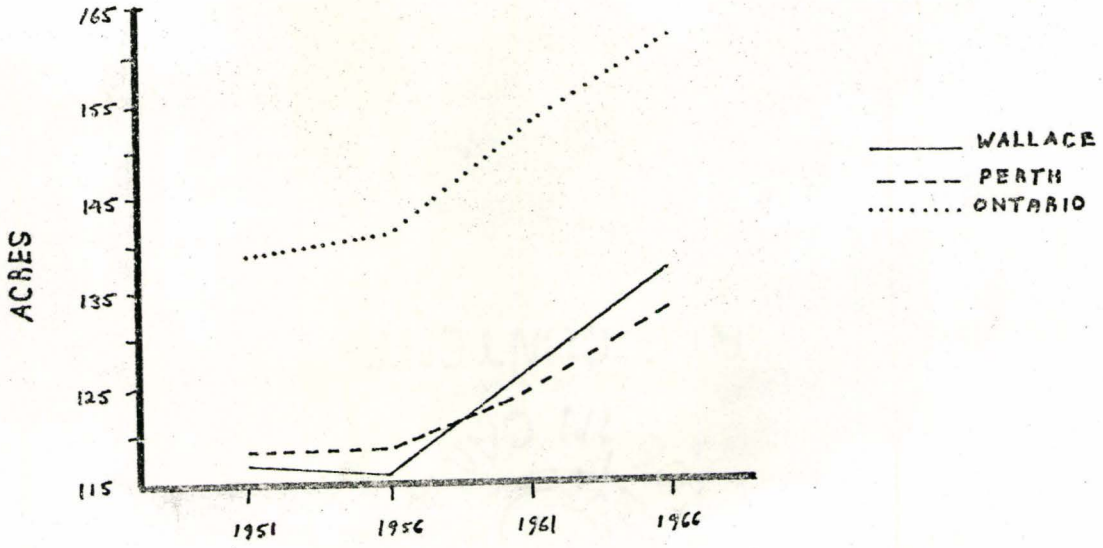

Figure 11

IMPROVED LAND AS A %'AGE OF TOTAL FARM-LAND

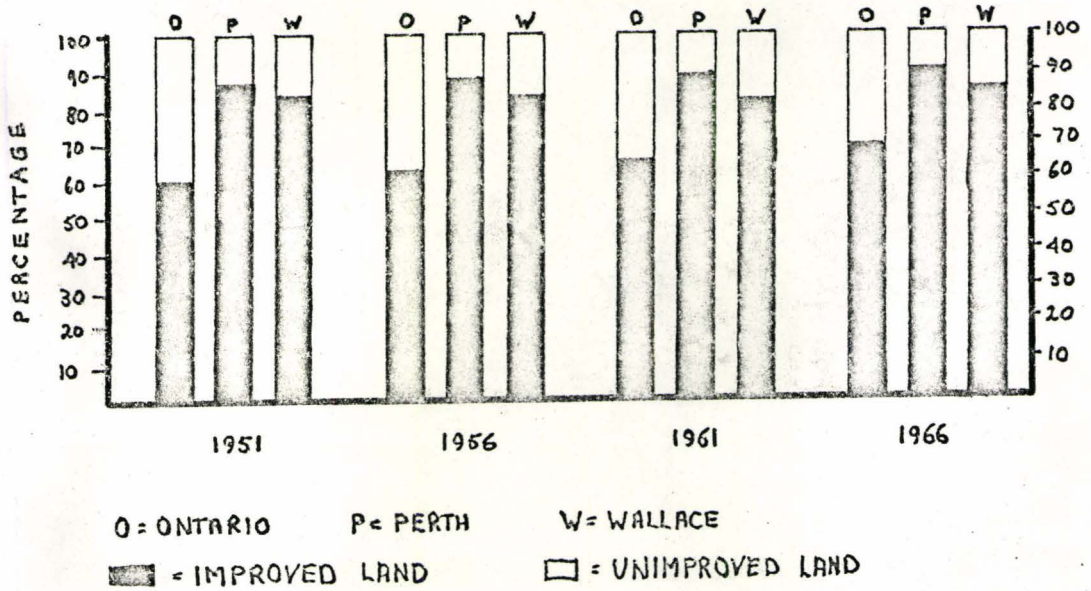

Figure 12-a

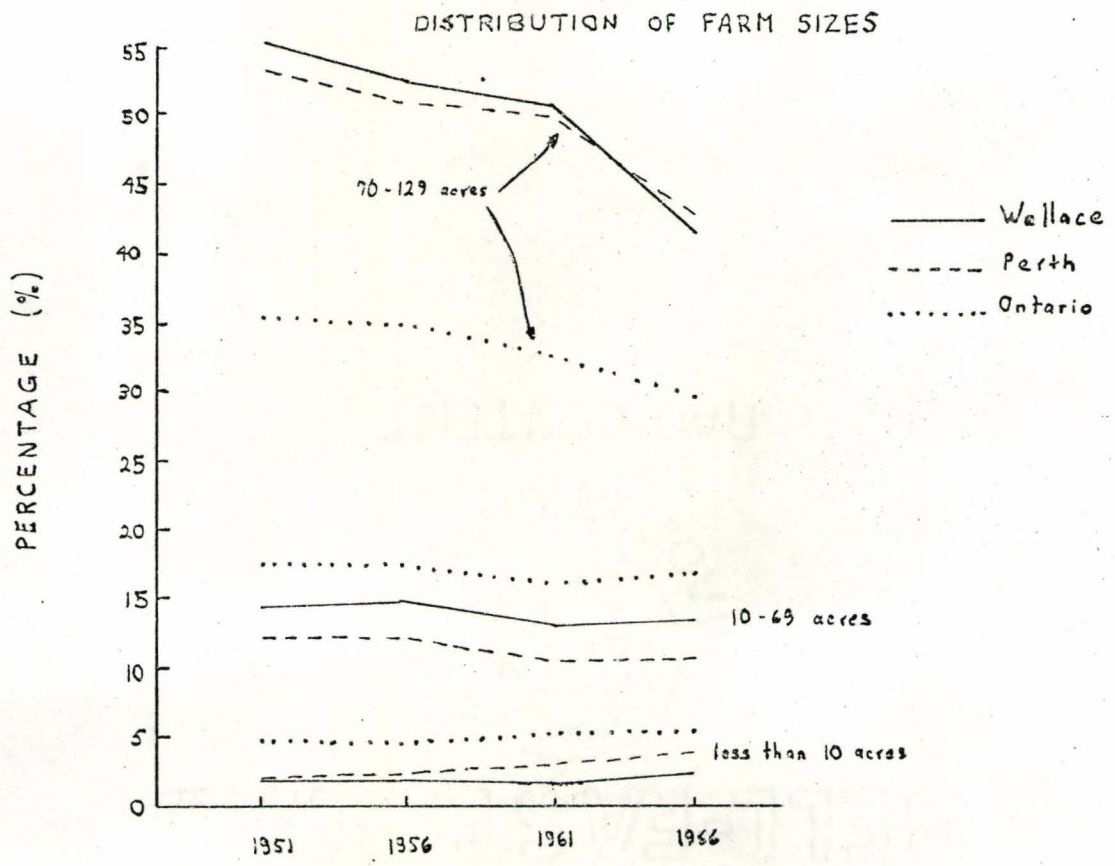

Figure 12-b

DISTRIBUTION OF FARM SIZES

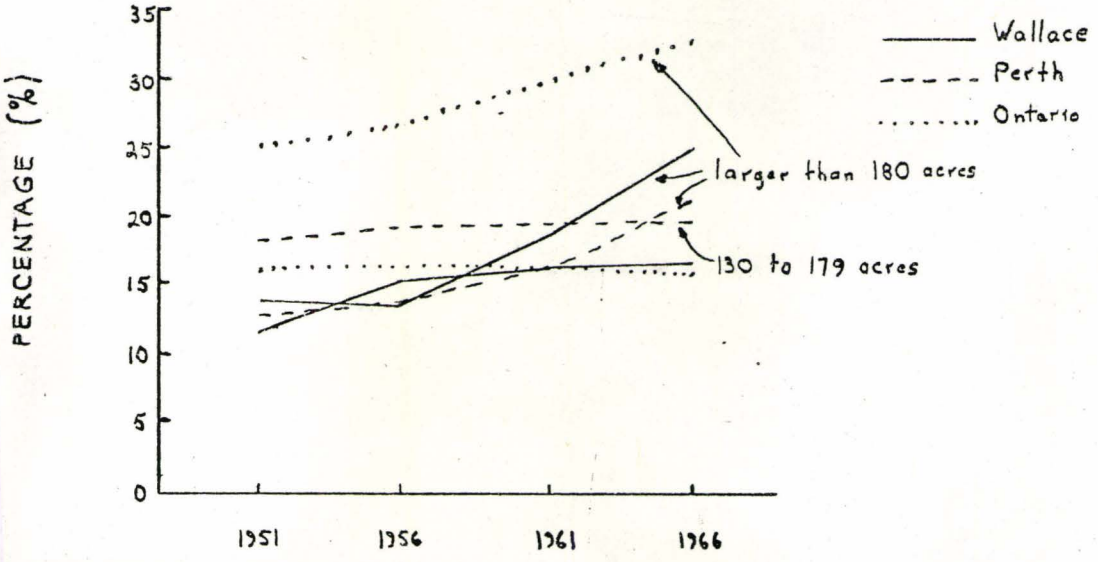

Figure 13 CROP ACREAGES

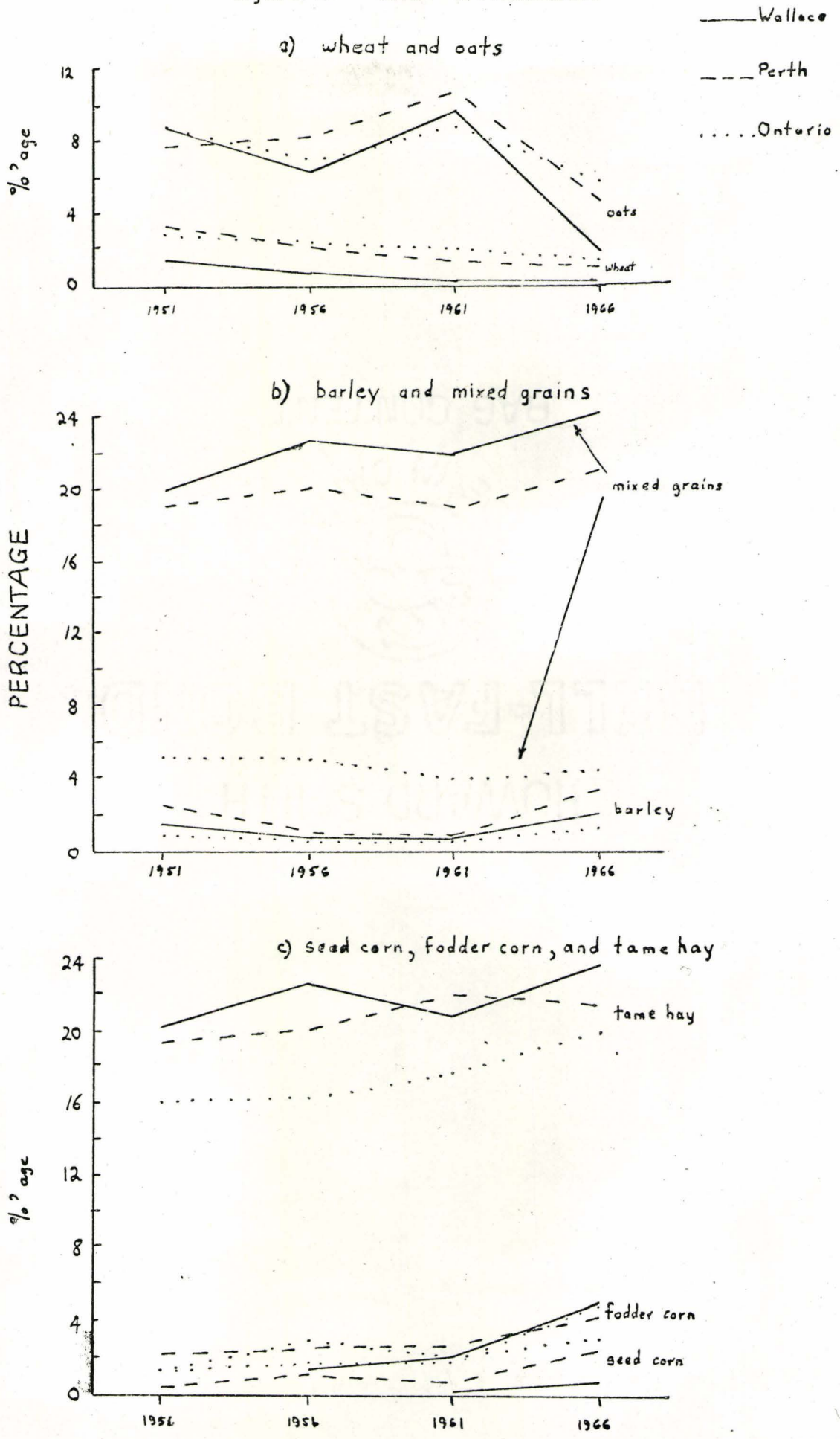

TABLE 8: WALLACE TOWNSHIP:

DATA COLLECTED IN THE SUMMER OF 1970

		AREA[1]			NON-CROPLAND				CHANGES[3]	
	No. of Farms	Surv.[2]	Unsurv.	Bush	Build.	Past.	Other Waste	Total	Pl'd.	Sd'd.
DAIRY	12	1,788	326	211	52	377	15	655	72	78
DAIRY & HOGS	14	1,852	---	207	44	353	50	654	80	108
BEEF	8	1,293	213	123	34	242	27	426	27	31
BEEF & HOGS	6	940	50	101	28	188	35	352	81	93
HOGS	3	300	---	16	8	6	---	30	----	---
OTHER	4	610	---	74	20	123	113[4]	330	---	---
TOTAL	47	6,783	589	732	186	1,289	240	2,477	260	310

1) Area in acres for all data

2) Some of the farmers owned land outside of Wallace. Crop data etc., is only for land within the township.

3) Changes indicate acres of grassland being ploughed for crops, (Pl'd), and acres of crop land seeded down to grass (Sd'd).

4) Includes 65 acres of summer fallow.

TABLE 8: WALLACE TOWNSHIP:

DATA COLLECTED IN THE SUMMER OF 1970 (Cont.)

	CROPLAND									
	Wheat	Oats	Barley	2-Way Mix	3-Way Mix	Seed Corn[6]	Fodder Corn[7]	Tame Hay	Other Crops	Total
DAIRY	---	---	63	60	287	55	107	561	--	1,133
DAIRY & HOGS	---	32	---	108	505	---	82	465	6[8]	1,198
BEEF	---	---	---	101	206	---	422	138	--	867
BEEF & HOGS	---	---	38	149	85	---	119	197	--	588
HOGS	---	---	180	17	---	65	---	8	--	270
OTHER	50	---	---	74	---	---	26	130	--	280
TOTAL	50	32	281	509	1,083	120	756	1,495	6	4,336

5) 2-way mixed grains were always oats and barley. 3-way mixes contained oats, barley and wheat.

6) Seed corn is intended to mean high moisture shelled corn; some of which is fed to livestock.

7) Fodder corn includes both ensilage and cobcorn.

8) Six acres of fall rye.

CHAPTER 4

Farm-Types of Wallace Township

Numerical Distribution of Farm-Types

In order to facilitate the analysis of the data which was collected during the interviews, each farm was classified on the basis of "type of enterprise", rather than on the basis of gross income or other such criteria. It was discovered that size of farm and particular crop combinations could be correlated with type of farming. In the following pages a description will be presented of the nature and extent of the relationships between type of operation and farm size, and between type of operation and crop combination.

Generally, the overall distribution of the types of enterprises was very similar to what the author expected to find. Dairy specialty farms were more numerous than beef specialty farms. "Dairy and hogs" farms and "beef and hogs" farms were known to be important farm types before the survey was conducted. The only surprising aspect of the distribution was the relative absence of hog specialty farms. The author expected to find a greater number of large-scale hog operations and perhaps fewer cattle and hog combination farms.

Table 7, page 43 presented the results of the survey conducted in July and August, 1970. From this table, the distribution of farm operations can be summarized here as follows: (1) Dairy - 12 farms, (2) Dairy and Hogs - 14 farms, (3) Beef - 8 farms, (4) Beef and Hogs - 6 farms, (5) Hogs - 3 farms, and (6) Others - 4 farms. Dairy cattle, of a variety of breeds, were being utilized for the production of milk for either the Group I Pool or the Group II Pool, or 26, (55%) of the farms. If the sample farms are truly representative of the distribution of farm operations for the entire township, it can therefore be concluded that more than half of the farmers of Wallace are involved in some way with the problem-plagued dairy industry.

On the other hand, beef cattle, which are more important and more numerous in the counties to the north and west of Wallace Township, were being raised on only 14, (30%) of the farms in the sample. The farmers, themselves, believed that beef production was more important in the township at the present, than it was ten years ago, due in part to the introduction of hybrid corn. But, they also thought that beef would not continue to grow in importance to a position where it replaces dairying as the major activity of the area. The beef farmers felt that dairy would retain its position of dominance.

It was stated in Chapter Three that, on the average, each hog producer in Perth County turned out 70 hogs in 1966. This is equivalent to two average-size litters of seven piglets from each of five sows for each pig farmer. This is by no means an abnormally high rate of production from even poorer sows. Good quality sows will normally produce three litters

yearly. It appears that hogs were, indeed, being produced on a very small scale by a large number of farmers. Only 3, (6%) of the 47 farmers in the sample were specializing in the production of hogs. However, 20 other farmers maintained a few hogs to supplement their dairy or beef incomes. Therefore, approximately 50% of the farmers in the township, (23 farmers out of the 47 in the sample) are involved in the feeding and producing of hogs. The specialists may produce more hogs, but they are outnumbered by a ratio of nearly 7:1 by those men who are involved in hogs as a subsidiary type of enterprise.

Ryerson, (1970)[1], has demonstrated the applicability of using aerial photography to determine types of farming enterprises. The two criteria which were used to distinguish between the varying types of farms were: (1) ratio of cropland in hay, grain, or corn, and (2) shape and dimensions of the farm buildings. The results of Ryerson's study cannot be directly compared to the results of this report because of the dissimilarities in the location of the sample farms. According to Reeds'[2], (1955), the four sample areas selected by Ryerson would be in the following agricultural regions: (1) Hamilton: Western Ontario-Lower Niagara region; mixed farming with a dairy, beef, hog, or poultry emphasis; (2) Wardsville (Elgin County): Erie-St. Claire region; cash crops, hog and poultry farming, (3) Huron (near Exeter in Huron County); Huron Shore region; an emphasis on beans, peas, and cattle, and (4) Owen Sound (Grey County):

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[1]Ryerson, R.A., A Model to Predict a Measure of Agricultural Productivity Using Remote Sensing Techniques.

[2]Reeds, L.G., The Agricultural Geography of Southern Ontario, 1951; map in back folder of his report.

Northern Bruce-Grey region; mixed farming with an emphasis on beef, sheep, and hogs. However, Wallace Township is located in the Western Ontario-Lower Niagara region, on the fringe of the Oxford-Perth-Waterloo livestock and dairy specialty region. Table 9, which follows, presents a comparison of the numbers of farms of each type which were found by Ryerson[1], with the number of farms of the same type discovered in Wallace in 1970.

TABLE 9

COMPARISON OF THE NUMBER OF FARM-TYPES FOUND BY RYERSON (1968-69) AND BY GATES (1970)

Farm-Type	Wallace	Huron	Hamilton	Owen Sound	Wardsville
Dairy	12 (26%)	4 (20%)	12 (60%)	10 (50%)	0 (0%)
Dairy & Hogs	14 (30%)	0 (0%)	1 (5%)	0 (0%)	0 (0%)
Beef	8 (17%)	9 (45%)	6 (30%)	7 (35%)	14 (70%)
Beef & Hogs	6 (13%)	4 (20%)	0 (0%)	0 (0%)	4 (20%)
Hogs	3 (6%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Others	4 (8%)	3 (15%)	1 (5%)	3 (15%)	2 (10%)

Three significant facts arise from an analysis of Table 9. First, none of the farms in the Ryerson study were hog specialty. It is true that hogs are less significant in these other regions than they are in Wallace, but it is still interesting that no specialists were discovered. The decreased importance of hogs in Ryersons' sample areas leads to the

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[1]Ryerson, R.A., op. cit., pp. 112-115.

second significant fact. A tremendous difference exists in the number of "dairy and hogs" farms when Wallace is compared to the other four regions. This author can only suggest that the difference can be explained by the facts that either this type is peculiar to Wallace and surrounding areas, or that this type of enterprise is virtually non-existent in the particular areas sampled by Ryerson.

The farms in Wallace possess one characteristic non-agricultural use of the land. Forty-five of the farms in the sample contained woodlots totalling 732 acres. In nearly all cases, the forested area was located at the back of the farms, along the fence-lines between adjacent concessions. The aerial photographs examined by the author showed a linear woodlot pattern.[1] Partial explanation for this may be found by analyzing the geometric shape of the standard 100-acre lot in the study area. The length-to-width ratio of these lots is 2.5 to 1. It would seem that the acres farthest from the farm buildings were left forested in the pioneer era because of the time and distance factors involved in getting crops into the barns. Although these factors are almost insignificant in modern, mechanized agriculture, the woodlots remain on most of the farms. Some of the farmers are guarding their woodlots because they represent a potential source of income. Some of the woodlots contain good stands of maple trees which are used each spring for the processing and selling of maple syrup. But, many of the farmers who were interviewed could give no explanation when they were asked why they had not cleared all of the land. They

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[1]Ontario Department of Lands and Forests, photos no. 436804, 437804, and 437811.

merely wished to leave a small portion of their land in forest. Certainly, these forests add a touch of beauty to the countryside and are a valuable asset because of the wildlife that they support.

Before describing the various types of enterprises, it is necessary to define the use of the word "corn". Corn was being grown on 25 of the farms in 1970 in acreages varying from 5% of the total cropland to 100% of the total. On all of these farms, the corn was used overwhelmingly as a livestock feed. None of it was being sold as a cash crop, (grain or seed corn). In the analysis of the types of farming operations, no distinction will be made between ensilage corn, cob-corn, and high moisture-shelled corn. The corn harvested from the acreages characteristic of the various farm-types, can be stored by any of the above-mentioned methods, but it is all used in an identical manner. Corn acreage is the major criterion in distinguishing sub-types of the various types of enterprises.

Dairy Farms

The twelve dairy farms occupy a substantial portion of the land involved in the survey. The 2,114 acres in these farms, which is nearly 29% of the total sample area, creates an average dairy farm-size of 176.2 acres. This is the second largest farm-size of the five major types of operations. As shown on figure 14a, page 61, there are two distinct types of dairy farms: those farms where corn is non-existent or minimal, (less than 10% of the productive farm land), and those farms where corn accounts for 30% to 40% of the productive farm land.

The two farms in the latter category, where corn is more important than small grains in the feed programme, merit a special classification because of some of their other characteristics. These farms are the largest of the twelve dairy farms - one containing 300 acres, and the other, 280 acres. Both farms are producing fluid milk in the Group I Pool, and have elaborate pipeline milking systems.

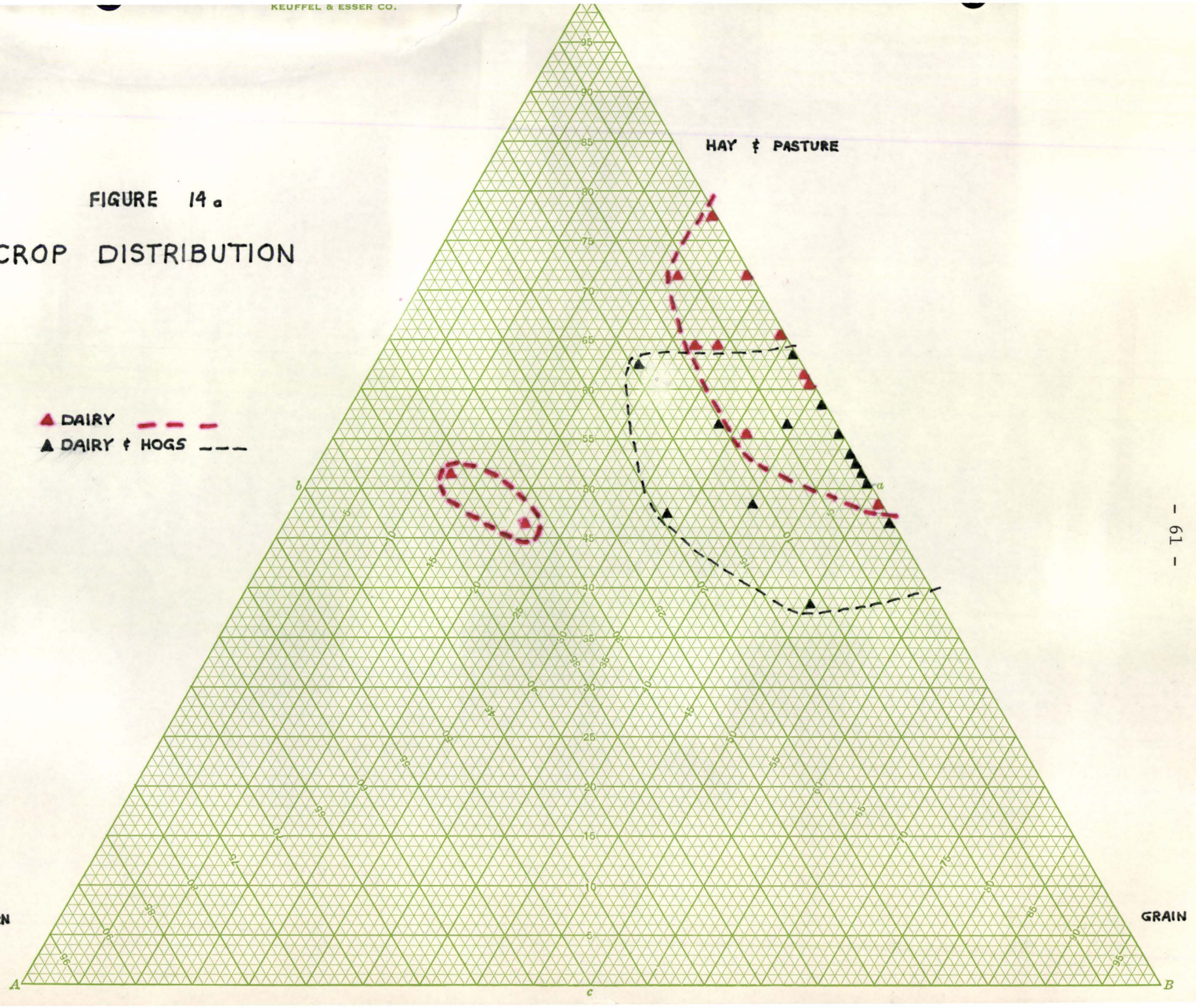
Although acreages may be of little significance when only two farms are being considered, the average figures for crop distribution for these farms are different than similar figures for the other types of farms. Forty-nine percent, (49%), of the productive land is used for pasture and hay, of which three-fifths is pasture and two fifths is hay. Only 18% of the land grows small grains, while 33% is used for corn. The large-scale, corn-based operators are able to support decreases in the amount of land devoted to hay because of the enhanced nutritional value of corn.

The other ten dairy farms do not rely upon corn as the basic non-grass, feed crop. These farms are smaller in size; the average size being only 153 acres. Almost two-thirds of the productive land is used for hay and pasture, of which 60% is hay and 40% is pasture. Thirty percent, (30%) of the land has small grains, composed mainly of a three-way, oat-barley-wheat mixture. The remaining 3% of the land is sown with corn. These smaller farms apparently cannot afford to make the large investments necessary to convert to a corn-based feeding programme. The smaller dairy farms, along with the dairy and hog farms, are still the backbone of the dairy industry in Wallace Township.

KEUFFEL & ESSER CO.

FIGURE 14 a

CROP DISTRIBUTION



Dairy and Hogs

The farmers involved in this type of operation are dominant in the township. They are also the most consistent group of farmers, when the percentage distribution of the various crops is analysed. This fact is clearly illustrated by the tight clustering of the black triangles on figure 14(a), page 61. Only six of these fourteen farms have corn, resulting in an average of 5% of the cropland in corn on each farm. A further 53% of the land is occupied by grasses for hay and pasture. Here again, the ratio of hay to pasture is 1.5 to 1. Small grains are grown on the remaining 42% of the productive farm land. More grain is grown on this type of farm than on any other type of farm where cattle are maintained. The increase in grain is necessitated by the feed requirements of the hogs - hogs cannot be raised on baled hay. Nearly 80% of the grain grown on these farms is the three-way mixture, with a somewhat larger proportion of barley than was incorporated on the dairy farms. The feed requirements of the hogs explain the importance of the barley in the grain mixture.

The average size of the "dairy and hogs" farms in only 132 acres. Of the fourteen farms in this category, two are less than 100 acres, eight are between 100 acres and 150 acres, three are 200 acres, and only one farm is larger than 200 acres. All of the farms are representative of the traditional family farm, which are small and compact, with father and son doing all of the work. Furthermore, most of the dairy and hog farms did not outwardly display the same degree of prosperity as the large and medium sized dairy farms. From the scattered pieces of information which the

author collected, it seems as if the rapid increase in the importance of hogs on the "dairy and hogs" farms, has been a phenomenon of the past decade, caused by the split of milk producers into fluid or industrial shippers. Although there is much talk about the economic benefits of large-scale, specialized, intensive production, the small dairy and hog combination farms will continue to be a vital aspect of the local economy of Wallace Township.

Beef

Wallace Township contains two distinct types of beef specialty farms. One variety is dominated by the large percentage of cropland that is devoted to hay and pasture; the other is characterized by an almost complete dependence upon corn. Figure 14(b), page 64, clearly shows this distinction. Only two of the eight farms are less than 150 acres in size, and both of these farms are in the hay and pasture category. The beef farms have an average size of 188 acres, thereby making them the largest type of farming operation in the study area.

It was previously mentioned that the importance of beef farming had shown a rapid increase in recent years, but the consensus of the farmers was that this rate of increase would not continue. The value of listening to what the farmer has to say about his own operation is illustrated by the following comment: "the potential rate of increase in fed beef production in the '70s may not equal the rapid rate of expansion that occurred during the past decade."[1] However, actual total production of beef for consumption will maintain its present rate of growth because, "a continuing

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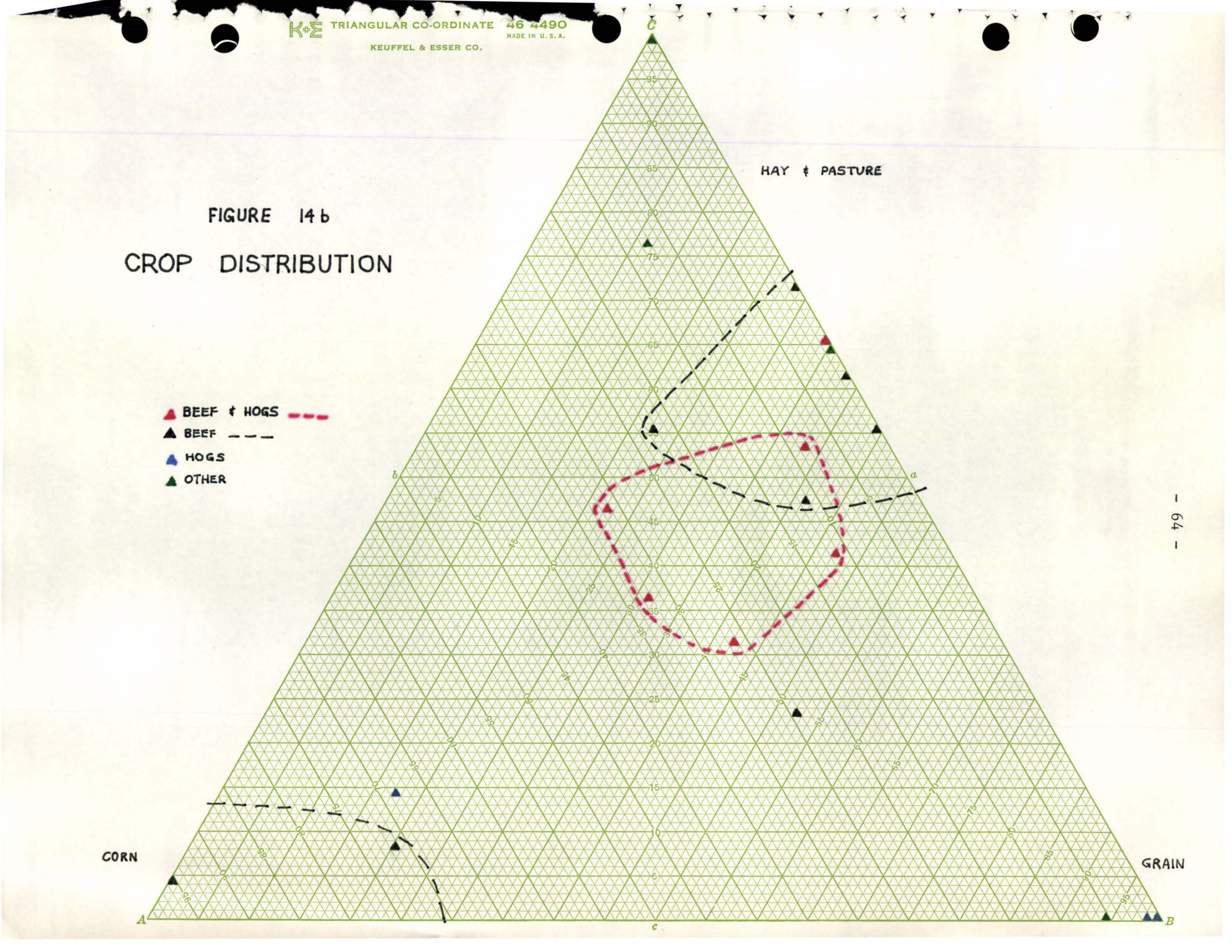
[1] Good Farming, vol. 22, no. 1, January 1971; p. 18.

FIGURE 14 b

CROP DISTRIBUTION



rise in cattle inventories, as a result of expanding beef-cow herds, can be expected in the early '70s in Canada.[1] This phenomenon is already occurring in Wallace, as shown by the increasing number of Hostein calves sold for beef each week at the Listowel Livestock Market.

At present, the majority of the beef farmers in Wallace are using a less-intensive method of production. The cattle roam freely over the fenced pasture fields throughout the growing season from May until October. Those animals that are not shipped to market in the autumn are fed in barns for the winter on a diet of hay, and chopped and enriched small grains. In some cases, a small daily ration of corn is added to the above major feeds. The average crop distribution for these farms indicates that 54% of the productive land is used for hay and pasture, with a hay-to-pasture ratio of 1.8 to 1. A further 37% of the land is in small grains, of which 60% is a three-way mixture and 40% was a two-way, oats and barley mixture. The remaining 9% of the land is used for corn. Generally, these farms are slightly smaller than the overall average size of beef farms, being only 166 acres compared to a total beef average size of 188 acres.

The two corn-based beef operations are much larger in size. One farm is 320 acres and the other is 230 acres. Both farms had 185 acres of ensilage corn in 1970, and both were involved in an intensive feedlot operation. The owner of the larger farm also grew 55 acres of three-way mixed grain to supplement the corn in his feeding programme.

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[1] Ibid., p. 18.

The peculiar aspect of this type of operation is found in the location of the farms. Both farms are on the same block of the same concession. Furthermore, there is a third, and larger beef operation in between the above-mentioned two farms. This farm was not included in the sample, but the author knows this operator and viewed his three silos and his corn fields while travelling to the sampled farms. This particular area of the township has become a region of specialized, intensive beef production. (see map inside back cover, concession 8, lots 25 to 30.)

Beef and Hogs

The beef and hog farms of Wallace are represented by the clustering of red triangles in the central portion of figure 14(b). As shown by the close grouping of these triangles, these six farms are basically identical, except that one farm has no corn. On the average, these farms are medium-sized when compared to the other types of farms in the township. The average farm-size for Wallace is 157 acres, while for the "beef and hogs" farms the average is 165 acres. The hogs are only of secondary importance to the beef cattle on all six farms.

This type of farm also has its own characteristic crop combinations. Forty-six percent, (46%) of the productive land is used for hay and pasture, with equal acreages devoted to each use. Small grains are grown on 36% of the land, of which 55% is a two-way, oats and barley mixture, 31% is a three-way mixture, and 14% is barley. Corn is grown on the remaining 18% of the productive land.

Hogs

The three hog farms visited during the summer were located in three separate sections of the township. Each farm was only 100 acres in size, and each was operated by a relatively young owner. All three men were hopeful of expanding their acreage in the future, because the enormous expense involved in establishing a specialized hog operation did not enable them to purchase more than the 100 acres when they began farming.

The three sample farms are representative of the two major types of intensive hog production found in Wallace Township. One farm had a crop distribution of 70% corn, (high moisture-shelled corn), 20% oats and barley mixed grains, and 10% hay and pasture. The hay and pasture land was untiled and was being rented to the owner's brother for his dairy calves. This piece of land cannot therefore be considered as a true part of the land-use for the hog operation, although it will become so as soon as the tiles are laid. This hog farmer maintains sows, raises the piglets until they are weaned, and then sells them for fattening. On the other two hog farms, all of the productive land was sown with barley. Both farmers said that they had to apply heavy amounts of artificial fertilizer when sowing their crops; usually about 300 pounds per acre. These two farmers purchase weaned pigs, fatten them on a high protein feed programme, and then ship them to the markets for slaughtering. From the above discussion, it is easily recognizable that not only are there two distinct types of specialized hog farms based on different cropping patterns, but also there are two distinguishable phases of the production process.

Other Farms

The types of operations being undertaken on the four farms which were not classified in any of the five major categories, will be discussed briefly, in order to present some indication of the diversity of agriculture in the township. The first farm consisted of 200 acres, all of which was for sale. No livestock were kept on the farm, the buildings were in a very poor condition, and the owner was working in Palmerston. Neighbours were renting 50 acres for hay, and the owner had sown winter wheat as a cash crop on 30 acres. The rest of the land was in fallow or bush. Another type of farm was a 100 acre grass farm owned by a retired farmer and his wife. Two neighbouring farmers apparently shared the rental for the 38 acres of pasture and the 50 acres of hay on this farm. A third variety of farm was owned by a farmer who classed his operation as turkey broilers. He owned one large barn where he raised the turkeys on purchased feed. A hog farmer rented 75 acres of the farm and sowed a two-way mixture on all of this land. It is interesting to note that the mix ratio in the grain was 80% barley and 20% oats. This is a further illustration of the dependence on barley by the hog farmers who do not use corn as the major source of feed. The final type of farm found during the survey was a 210 acre, beef and chicken broiler operation. The land was owned by a feed mill operator. The two chicken barns, with a total capacity of 90,000 birds were also owned by the same person. The tenants rented part of the land for their beef cattle, and were responsible for looking after the chickens. The hay and corn on the farm were used for the cattle, while the grain grown on the farm was apparently used as a feed for the chickens.

Conclusions

It is highly probable that there are other minor varieties of types of farming enterprises in Wallace, than were discovered in the sample of 47 farms. Nevertheless, certain clear patterns were established which can be used to characterize the agricultural land-use in the area. The census data and other statistics, which were presented in Chapter Three, indicated the importance of dairying and of hog production in Perth County and in Wallace Township. The large relative number of farms in the sample which were involved in either or both of these types of production is strong evidence that the sample is representative of the entire township. Furthermore, only the largescale, specialized operators have been able to utilize corn to any significant extent. As yet, the small-scale farmer has been unable to reap the benefits which can be gained by using corn as the predominant food source for livestock.

No reference has as yet been made to the practice of crop rotation. Only the three hog farmers and the two large-scale corn-based beef farmers did not have to consider crop rotation in their yearly land use planning programmes. Although the particular system of rotation may vary slightly from farm to farm because of the personal preferences of the individual farmers, the following table displays a typical eight-year cycle which many farmers in the township are likely to be currently employing.

TABLE 10

TYPICAL SYSTEM OF CROP ROTATION FOR ONE FIELD

Year	Land Use
1	hay; seeded down in the previous spring
2	hay
3	hay and pasture
4	pasture
5	pasture; ploughed down late in autumn
6	grain or corn
7	grain
8	grain; grass seeded down for the following year

One of the confusing peculiarities of land use, which has not been previously mentioned, is illustrated by Table 10. Often, a third-year hay field is the first field of hay to be harvested, especially if the farmer only removes one crop of hay from each hay field each year. This enables a good growth of "after-grass" to appear, which is utilized as a late season pasture for the cattle. A good field of after-grass can allow the farmer to keep his cattle "on grass" until the middle or end of October. This often permits him to feed a slightly larger ration of hay and grain to each animal during the winter, because the cattle will be in the barn for a shorter period of time. The use of older hay fields for late season pasture also aids in explaining why the majority of the farmers reported that they had more acres of hay than acres of pasture. However, this result was biased by the nature of the questions posed to the farmers.

They were asked to indicate as pasture only those fields which were used as pasture throughout the entire summer. If the data were recalculated, allowing the dual-purpose fields to be divided equally between hay and pasture, the results obtained would indicate nearly equal acreages of hay and pasture for most of the farms in the sample. Nevertheless, the occurrence of large acreages of grass for either purpose, is perhaps the dominant aspect of the agricultural land-use in the township.

Table 11, which follows on page 72, presents a summary of the characteristic sizes of the various types of farming enterprises, and the typical crop combinations for each farm-type. Ryerson used triangular crop distribution diagrams[1] similar to those prepared for this report. Although he compared hay, corn, and grain, while the present analysis employed hay and pasture, corn, and grain, it is useful to denote some of the similarities and some of the differences which are evident in the two reports. This is accomplished in Table 12, page 73. The crop combinations which were computed by the two authors for the dairy farms, show a marked similarity, even though the sample farms were from widely spaced regions of the province. However, there is little recognizable agreement on the distribution of cropland on the beef farms.

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[1] Ryerson, op. cit., p. 11.

TABLE 11

SIZE AND CROP DISTRIBUTIONS FOR THE MAJOR FARM-TYPES

IN WALLACE TOWNSHIP, 1970

Type	Subtype	Number of Farms	Average Size	% Hay and Pasture	% Grain	% Corn
Dairy	(1) little or no corn	10	153.5 acres	65.9	31.0	3.1
	(2) more than 30% corn	2	290.0 "	48.9	17.7	33.4
Dairy and Hogs		14	132.3 "	53.2	41.6	5.2
Beef	(1) less than 20% corn	6	166.0 "	52.9	37.3	9.7
	(2) corn-dominant	2	275.0 "	7.2	10.2	83.6
Beef and Hogs		6	165.0 "	45.7	36.2	18.2
Hogs	(1) corn fed	1	100.0 "	10.6	20.2	69.2
	(2) barley fed	2	100.0 "	0.0	0.0	100.0
Other Farms		4	152.5 "	60.3	35.5	4.2

TABLE 12

COMPARISON OF CROP DISTRIBUTIONS FOR RYERSON (1968-69)

AND FOR GATES (1970)

Type	Subtype	% Hay* and Pasture		% Grain		% Corn	
		Ryerson	Gates	Ryerson	Gates	Ryerson	Gates
Dairy	(1) little or no corn	76.5	65.9	21.0	31.0	2.5	3.1
	(2) corn-intermediary	50.9	48.9	22.9	17.7	26.2	33.4
	(3) corn-dominant	0.0	**	34.5	**	65.5	**
Beef	(1) little or no corn	87.4	52.9	9.6	37.3	3.0	9.7
	(2) corn-dominant	25.4	7.2	17.0	10.2	57.6	83.6

* The percentages for the Ryerson data are only for Hay.

** No farms of this sub-type were found in 1970.

CHAPTER 5

Summary and Conclusions

Agriculture is the dominant economic activity in Wallace Township. The physical base permits a wide variety of crops to be grown and is quite suitable for the development of livestock, dairying, and mixed farming. The most important physical limitation relates to soil drainage. However, the use of tile in the fields and open ditches across the land facilitates the removal of excess water into the tributaries of the Maitland River, and has, for the most part, overcome this serious handicap.

In addition to the favourable physical conditions, the social and economic infrastructure in Ontario, and especially in Western Ontario, help to create a generally successful agricultural community in Wallace Township. The provincial population represents a high demand for agricultural products and the adequate transportation facilities enable easy connections between producers in Wallace and processors or consumers elsewhere in Ontario. The proximity of Kitchener-Waterloo where there are a number of packing plants has stimulated hog production. Furthermore, the agricultural tradition in the township has been evolving for 120 years. The family names of many of the original pioneers are still found on farm mailboxes and barns throughout the area. Although many of the present-day farmers have limited formal education, they are efficient operators. The experience and skills which they have acquired are the results of four generations of continuous and successful farming.

As traditional as the farmers may be, they have been recently demonstrating their receptiveness to innovations and their adaptiveness to market conditions. Tractors and a large variety of other implements are found on all of the farms in the sample. Numerous trends which have been developing in the province are evident in the township. Examples of this may be discovered in the decreasing acreages allotted to wheat and oats, in the diminishing number of farms, and the increase of farm-size. However, one authority, Dr. Don Grieve of the animal science department at the University of Guelph, foresees a levelling-off of the rate of increase of farm-size. He has predicted that "most dairy farms will remain relatively small family-size units in the near future with 40 to 50 cows and, at most, one hired hand."[1] If this prediction holds true, dairy farming will maintain its dominance in the overall agricultural economy of the township.

Analysis of the 1966 census data for agriculture in Ontario illustrates three major characteristics of farming in Perth County and Wallace Township. Perth had more milk cows than any other county in the province in 1966, with Wallace supplying 10% of the county's total. Perth was also the leading producer of hogs in 1966, with the township again contributing 10% of the total for the county. The total acreage of mixed grain was the most significant feature of the land-use in 1966. Twenty-five percent, (25%) of the farm-land in the Township was devoted to mixed grain, while the county had 13% of all mixed grain grown in Ontario. In

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[1] Dr. D. Grieve, "Family-Size Farms Practical", Western Ontario Farmer, March 11, 1971, p. 1.

comparison, the 1970 sample data shows that mixed grain accounted for 81% of the total acreage allotted to small grains, (wheat, oats, barley, or mixed grain), in the Township.

Perhaps the major emphasis of this thesis has been placed on the importance of corn in the various agricultural enterprises. "Corn has been called the "King of Feeds", and rightly so, as it produces more net energy per acre than any of the other grains or forage crops.[1] A good stand of corn can produce up to 7,000 pounds of Total Digestible Nutrients per acre.[2] Corn grows best on well-drained, deep, fertile loams, and on artificially-drained clay loams and clays.[3] The soils of Wallace Township are composed almost exclusively of these types. The Harriston silt loam exhibits the most favourable conditions for corn. The acreage of ensilage corn has shown a marked increase in the past twenty years in the Township, and this trend should continue into the future. The importance of corn is demonstrated by the fact that it was the sole criterion used to distinguish the varying systems of land-use associated with each of the major types of enterprises.

The geographic distribution of the types of farming enterprises provides an informative insight into the pattern of land-use in Wallace. It was previously stated, (page 56), that, according to Reeds (1955), Wallace is within the Western Ontario-Lower Niagara agricultural region.

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[1] Canada Department of Agriculture, Publication 1358, Corn for Livestock and Poultry, p. 3.

[2] Ibid., p. 4. Also, see Appendix 3.

[3] Canada Department of Agriculture, Publication 1025, Growing Corn, p. 7.

Therefore, Wallace should be characterized as "a zone of mixed farming", in which "dairying and livestock-raising comprise the most important elements."[1] However, twenty-six of the farms in the sample are classified as either "dairy" or "dairy and hogs", and nineteen of these are located south of the road allowance between concessions four and five. Furthermore, nine of the fourteen "beef" and "beef and hogs" farms are located north of the fourth concession. The varying types of enterprises do not appear to be evenly distributed throughout the area.

The conclusions that can be deduced from this are first, that the northern part of the township is adopting the characteristics of the Northern Bruce-Grey region of beef raising and mixed farming, and second, that the southern portion of Wallace bears a close resemblance to the mixed farming and dairy specialty farms of Reeds' Oxford-Perth-Waterloo region.[2] Reeds made two predictions in 1955 regarding the future trends in this general area. The first of these was that the area would experience an increasingly intensive use and specialization.[3] The second was that the dairy specialty region, centred in Oxford County, would expand into adjacent areas to the north and west.[4] The survey of farms in Wallace Township in 1970 has validated both of the predictions. The increasing intensification of dairying in the south coupled with the concentration of beef farming in the north, have created new regional characteristics.

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[1] L.G. Reeds, op. cit., p. 398.

[2] Ibid., pp. 401-402.

[3] Ibid., p. 399.

[4] Ibid., p. 401.

Wallace, therefore, has become part of a transition zone between two differing areas of specialization. It is unrealistic to draw a line along the fourth concession, or any other concession in the township, and label it the boundary between the beef and dairy specialty areas because the farmers themselves do not feel that the situation is completely stable. They believe that beef farming will not expand to any extent within the study area, yet, they believe that dairying might decline because of the controls exercised by the O.M.M.B. Nevertheless, at present, there is a definite variation in land-use from south to north between dairying and beef farming, and this distinction is likely to continue with little change in the immediate future.

The agricultural economy of Wallace Township can be characterized by the following features: (1) feedlots of Hereford and Shorthorn beef cattle, (2) numerous herds of Holstein dairy cattle, (3) large annual production of hogs derived from secondary activities, and (4) the overwhelming exclusiveness of the family-farm as the basic farm unit. The land-use associated with this economy will be typified by abundant pasture land, large acreages of mixed grains, and a steady increase in the amount of land used for the production of ensilage corn.

APPENDIX ONE

Maitland Watershed Study Says Dam, Reservoir Most Economical System[1]

A project to improve agricultural drainage in Wallace and Maryborough Townships and to give the Town of Listowel adequate flood control was announced. Engineers Crysler, Davis & Jorgensen Ltd. of Willowdale who prepared a 62-page report on the Upper Middle Maitland Watershed, have recommended to the Maitland Valley Conservation Authority that besides improvement to agricultural drainage, a Middle Maitland dam and reservoir be constructed and improvements made to the channel and conduit in Listowel.

Because of its importance to the area, details from the report are included in the following article:

Land Drainage

There are, at present, no storage reservoirs or lakes located in the watershed. Stream gradients are generally low and poorly defined. This results in large areas of depression storage and stream stagnation.

Although there is not an agricultural water deficiency in the Upper Middle Maitland Watershed, there is a definite need for low flow augmentation and flood control measures in the Listowel area. This is particularly true when drainage improvements are carried out since these measures will drain existing swampy areas.

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[1] Listowel Banner, January 28, 1971, p. 8.

The Upper Middle Maitland Watershed is peculiar in shape and this leads to a somewhat unusual runoff pattern. Observation of the flow records at the Listowel gauge indicates the occurrence of double peaks or a prolonged runoff following a storm. This is because the eastern or upper portion of the basin is smaller and the stream gradient is flatter resulting in a somewhat delayed runoff. The western portion of the watershed is larger and is fan shaped. This shape is more prone to the creation of large peak storms.

For these reasons it is important to create flood control storage as close to Listowel as possible. In the 1954 report, the large Listowel dam was most effective in terms of low flow augmentation and was not really efficient for flood control.

In general the most serious land drainage problems in the Wallace-Maryborough Township area are confined to two areas. The first extends from Lot 3, Concession 5 in Maryborough to Lot 6 Concession 5 of Wallace Township. The second area extends from Lot 7 Concession 4 to Lot 12 Concession 4 of Wallace.

While the economics of land drainage in the Upper Middle Maitland Watershed may be questionable with regard to the productivity of bottom land, the more serious problem is the barrier that such lands create in a farm. In many instances, a land owner has to travel in excess of one mile to get from one side of the river channel to the other. This problem must be borne in mind when economic justification for the drainage of these lands is considered.

Flooding

While land drainage and ditch maintenance are serious local problems of the agricultural community in the watershed, flood control is

of secondary concern. This is mainly because, due to poor drainage, no extensive development has been undertaken on the flood plains. With improved drainage and the "drying up" of flood plains this always remains a potential problem. Clearly, the authority should discourage such construction. The overall capacity of the Middle Maitland River channel is inadequate to carry the anticipated flood flows.

In spite of the good maintenance and the large expenditure on new ditches, maintenance in the main outlet channel, the Middle Maitland River, is poor and virtually non-existent. The obvious problem is that, under the Drainage Act, the townships have no way of maintaining a natural waterway. Obviously, the maintenance of the outlet channel is a problem which the M.V.C.A. must seriously consider.

Floodplain Use

The floodplains of the Middle Maitland River from Highway 23 upstream through the Town of Listowel to the road between Lots 18 and 19 of Wallace Township have been mapped. It now remains for the M.V.C.A. and the Town of Listowel to control the development of these areas.

People have refused to recognize that the floodplain is as much a part of the river system as is the river channel itself and that it will be used whenever the flow reaches flood discharges which exceed the channel capacity. In efforts to reduce the area covered by floods, man has often constructed artificial channels or closed conduits to prevent the floods from causing severe damage. The Listowel conduit is a classic example of floodplain constriction

1970 Proposal

The most economical solution for flood control in Listowel is found to be the construction of the Middle Maitland Dam and Reservoir in addition to minor repairs to the Listowel conduit and some minor regrading in the channel between the conduit and Highway 23. It would provide the badly needed flood control for the town. The 100 year flood hydrograph has an uncontrolled peak of 2100 cfs. When routed through the proposed reservoir, this flood would have a peak discharge of about 800 cfs. Routing of the 1883 flood hydrograph shows a reduction from 3600 cfs. to 1750 cfs. Clearly, the Middle Maitland Dam and Reservoir present a very efficient method of flood control for the town.

With a conservation storage volume of 400 acre feet and the provision of water level control, the Middle Maitland dam can be used to augment the very low summer flows which occur in the town. With the dam located immediately upstream of Listowel, the flushing of the river reach in town would be very easy and very direct.

APPENDIX TWO

Perth Top Hog Producer in Ontario[1]

Perth County strengthened its position as leading pork producing county in Ontario in 1970 by turning 338,152 hogs over to slaughter houses. This is up 43,000 from the 1969 marketing.

In 1969 Perth moved ahead of Waterloo County as the top pork producing county in Ontario. Waterloo's production dropped 50,000 in 1970 to 290,000 making Perth even further in the lead. Huron County was next with 243,000 up 55,000 from 1969; Wellington County was fourth with 228,841, up 45,000; Oxford County was fifth with 202,700, up 24,000.

The average weighted price of hogs in Ontario in 1970 was $30.14, which makes the pork business in Perth worth about $17,000,000 for the year. By the time you add in the breeding swine exported to other countries, and the weanling pigs sold to other countries, Perth's swine industry is worth about $20,000,000 per year.

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[1] Listowel Banner, February 25, 1971, p. 4.

APPENDIX THREE

The concept of Total Digestible Nutrients (T.D.N.) is used to represent the energy value, in pounds, of a feed-grain. Crops, such as corn, with high T.D.N. values "must be balanced with other feed ingredients to make a complete ration because they are low in protein and other nutrients."[1] Therefore, feeds with high T.D.N. values are used chiefly for their energy content. In analyzing a pig feed ration digestible energy is calculated on the assumption that one pound of T.D.N. contains 2,000 kilo-calories of digestible energy.[2]

With respect to corn, a good crop will yield 18 tons of silage per acre. This amount of feed provides about 7,000 pounds of T.D.N. per acre, which is sufficient for 2.5 cattle.[3] However, these figures produced by the Federal Department of Agriculture do not agree with those prepared by the Ontario Department of Agriculture and Food. In 1969, Perth had the second highest yield per acre of corn of all counties in Ontario, and this was only 14.0 tons per acre.[4] It follows, therefore, that an acre of corn in Wallace would be sufficient to support approximately 2.0 cattle.

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[1] Canada Department of Agriculture, pub. 1358, op. cit., p. 4.

[2] Ontario Department of Agriculture and Food, pub. 554, Feeding and Management of Pigs in Ontario, p. 8.

[3] Canada Department of Agriculture, pub. 1358, op. cit., p. 4.

[4] Ontario Department of Agriculture and Food, pub. 20, Agricultural Statistics for Ontario, 1969, p. 56.

Table 1[1], which follows, compares protein and T.D.N. yields per acre for a number of crops commonly used as livestock feeds, and clearly illustrates the high energy value of corn. Table 2, shows the percentage of the main nutrients found in corn and other feeds, based on dry matter content.

TABLE 1

PROTEIN AND T.D.N. (ENERGY) FOR COMMON FIELD CROPS

	Yield Per Acre				
	Weight per Bushel	Bushels	Pounds	Lbs. Protein	Lbs. T.D.N.
Rye	56	26.6	1,490	188	1,147
Oats	34	53.7	1,826	203	1,187
Barley	48	46.4	2,227	254	1,559
Winter Wheat	60	38.7	2,322	237	1,858
Corn	56	82.7	4,631	417	3,704
Soybeans	60	28.6	1,716	650	1,503

[1]Ontario Department of Agriculture and Food, pub. 554, op. cit., p. 9.

TABLE 2[1]

PERCENTAGE OF MAIN NUTRIENTS IN CORN AND OTHER FEEDS

Nutrients	Alfalfa Hay	Ground Barley	Ground Corn	Corn and Cobs	Whole Plant Corn Silage	Ground Oats	Ground Wheat
Proteins	16.0	12.0	10.6	9.2	8.3	12.8	14.0
Fats	2.0	2.0	4.4	3.7	3.0	5.0	2.0
Carbohydrates	33.8	68.0	69.0	65.0	---	58.0	68.0
Ash	8.9	2.8	1.4	1.8	6.0	3.5	1.8
Calcium	1.50	0.08	0.03	0.05	0.30	0.10	0.06
Phosphorous	0.24	0.45	0.28	0.30	0.24	0.35	0.04
Fiber	32.0	5.8	3.2	9.2	25.0	12.0	3.0
T.D.N (energy)	54.0	80.0	90.0	84.0	64.0	69.0	86.0

[1]Canada Department of Agriculture, pub. 1358, op. cit., p. 5.

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