

LAND USE RELATIONSHIPS

OF

NASSAGAWEYA TOWNSHIP

A THESIS

Presented to the Faculty of the Department of Geography

McMaster University

Hamilton, Ontario

In Partial Fulfillment of

The Requirements for the Degree of

Bachelor of Arts

by

Robert James Williamson

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TO MY MOTHER AND FATHER WHO  
MADE ALL THIS POSSIBLE.



## ACKNOWLEDGMENT

I would like to express my appreciation to the faculty of the Department of Geography at McMaster University, in particular Mr. D. Ford for his advise and supervision in the research and writing of this thesis, and to Miss Eileen Spragg for her devoted assistance in field work, colouring, and typing, as well as to all those of Nassagaweya Township, too numerous to mention, who provided willing assistance and information.

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(1) Purpose:

Land use patterns are forever changing, though some elements may persist for a very long time. These changes are defined by certain limits. The basic stabilizing factors controlling land use development are the physical features with which the land has been endowed. These, in conjunction with climate, produce the soil which directs what the natural use of the land will be. Imposed on this natural stable state is the work of man. He shapes the use of the land to his own designs, which, unlike nature, are forever changing, expanding or contracting dependent on such fickle entities as the economics of supply and demand. On the other hand there is a traditional stable side to this human factor which may cause land use patterns to persist beyond any reasonable duration. Man is also a social animal and his desire for community living has lent urban features to the land.

Contained herein is a description of the land use of Nassagaweya Township with an attempt to show the factors controlling it. This study has been pursued with the hope of determining whether this land use is practical and efficient as well as discovering any existing patterns or future trends.

(11) Method and Sources:

The first phase of the work began with the study of physiographic, soil, geologic, and topographic maps as

well as mosaic air photographs of the area. Chapman and Putnam's Physiographic Map of Southern Ontario served as an excellent base map but it was too general for a detailed study of such a local area. For this reason the author has produced a revised physiographic map of the township. For this, topographic and soil maps were used as well as field observations. The soil map of Halton County produced by the Department of Soils at the Ontario Agricultural College was of great help throughout this study.

Land use mapping was done on maps drawn from air photographs during mid-summer when agricultural crops were most easily identified.

The next phase of work began with the reading of all available sources of information, a list of which can be consulted in the Bibliography of this thesis. Of particular note is the History of Nassagaweya written by Joshua Norrish and brought up to date by the Township Council for the Nassagaweya centennial in 1950. Also of importance are the Canadian Census Reports 1851-1955 from which a great deal of statistical information was drawn.

The Nassagaweya Township Office was an important source of information but there was a lack of records as everything had been microfilmed and sent to Ottawa because of the lack of space and the serious fire hazard to the old township hall. Moreover, at the time of this report land assessments were being revived in the township because of the increase of rural non-farm dwellers. As a result an attempt to plot land values proved very complicated and frustrating and was abandoned on the advise of the township



clerk. However, I was given access to what records did exist and from the voters list I was able to prepare a map showing the influence of part-time farmers on the land use of the township.

I would particularly like to mention Mr. J. A. Francis of the Department of Agriculture for Halton County, the Oakville Creek Conservation Authority, and the many people of Nassagaweya Township who contributed to this work through interviews.

(iii) Value of This Study:

In preparing a thesis of this kind it is rewarding to know that the work undertaken will be of some value beyond the immediate academic achievement. This study of Nassagaweya Township is important for the following reasons:

(a) No previous geographical work of this kind has been done in Nassagaweya.Township.

(b) The township has a great deal of physical diversity which lends itself to the application of geographic principles.

(c) Nassagaweya is located on the northern boundary of Burlington, one of the most active planning communities in Ontario.

(d) As valuable farmland is swallowed up by the urban sprawl of the Golden Horseshoe, specialized agriculture such as dairying and fruit farming may have to be developed in Nassagaweya. Therefore the present agricultural land use and its potential are important.

(e) At present, it is an attractive backwoods area

on the edge of the urban centres of the Golden Horseshoe. Therefore it is attracting suburbanites and persons interested in hobby farms or estates. The Township Planning Committee is making preparations to control these recent developments and a land use classification is fundamental to their work. Accenting this point is the fact that Highway 401, recently built through the area, makes it accessible by express routes to all the major centres of Southern Ontario. The recent formation of the Halton County Industrial Development Committee is in recognition of the great potential within this area and makes a land use classification of Nassagaweya very important.

(f) Furthermore, Nassagaweya falls within the jurisdiction of three very active conservation authorities who are doing a great deal of flood control and park development planning. These are the Bronte Creek, Oakville Creek, and Grand River Authorities.

(g) This report will be of interest to those in the township who are curious about the factors underlying the land use and its evolution.

(iv) Outline:

This thesis is presented in four parts. The first two, discuss the physical and human geography of Nassagaweya Township with reference to the features that have shaped the land use. Then the present land use is discussed with regard to types, patterns, and factors involved. The last chapter gives a general summary of the features of the land use and the conclusion drawn from this work.

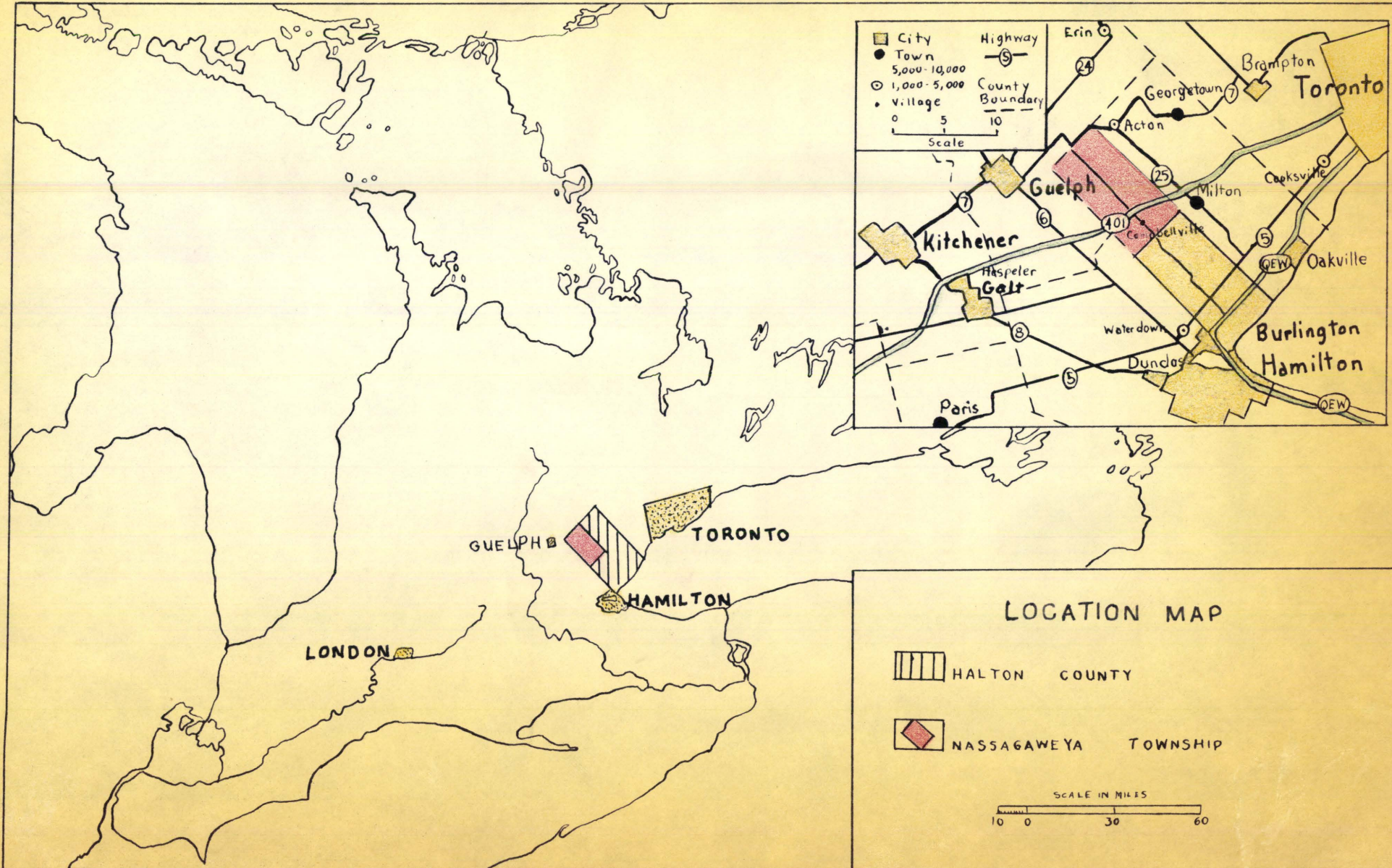
PHYSICAL GEOGRAPHY

(1) Introduction:

Nassagaweya Township is located in the west corner of Halton County, twenty miles northwest of Hamilton, on the edge of the Niagara escarpment. See Map. 1.



Esquising, Nelson, (now incorporated as the town of Burlington) and Trafalgar are the other townships which comprise the county. Nassagaweya is bounded on the northwest by Eramosa Township, on the southwest by Puslinch, and East Flamboro Townships, on the southeast by Burlington, and on the north-east by Esquesing Township. Nassagaweya is rectangular in shape being twelve miles long and six miles wide. Its area is seventy-two square miles or 46,080 acres. The longitudinal axis bears North  $45^{\circ}$  West, having been surveyed at right angles to the shore of Lake Ontario. The township is divided longitudinally into seven concessions, each containing thirty-two rectangular lots measuring 100 acres by 200 acres, these in turn are divided in half to give square farms of 100 acres each.

The location of Nassagaweya is significant in the land use for, by its position, it is in the Western Ontario Agricultural Region which consists of mixed farming with an emphasis on dairying. Moreover, the entire area is close to the core of the greatest marketing area in Ontario, both for agricultural and industrial products. The city of Toronto lies thirty miles to the east while Hamilton is twenty miles



City	Highway
● Town	5
○ 5,000-10,000	County Boundary
○ 1,000-5,000	
• Village	
Scale	
0	5 10

### LOCATION MAP

	HALTON COUNTY
	NASSAGAWEYA TOWNSHIP

SCALE IN MILES

10 0 30 60



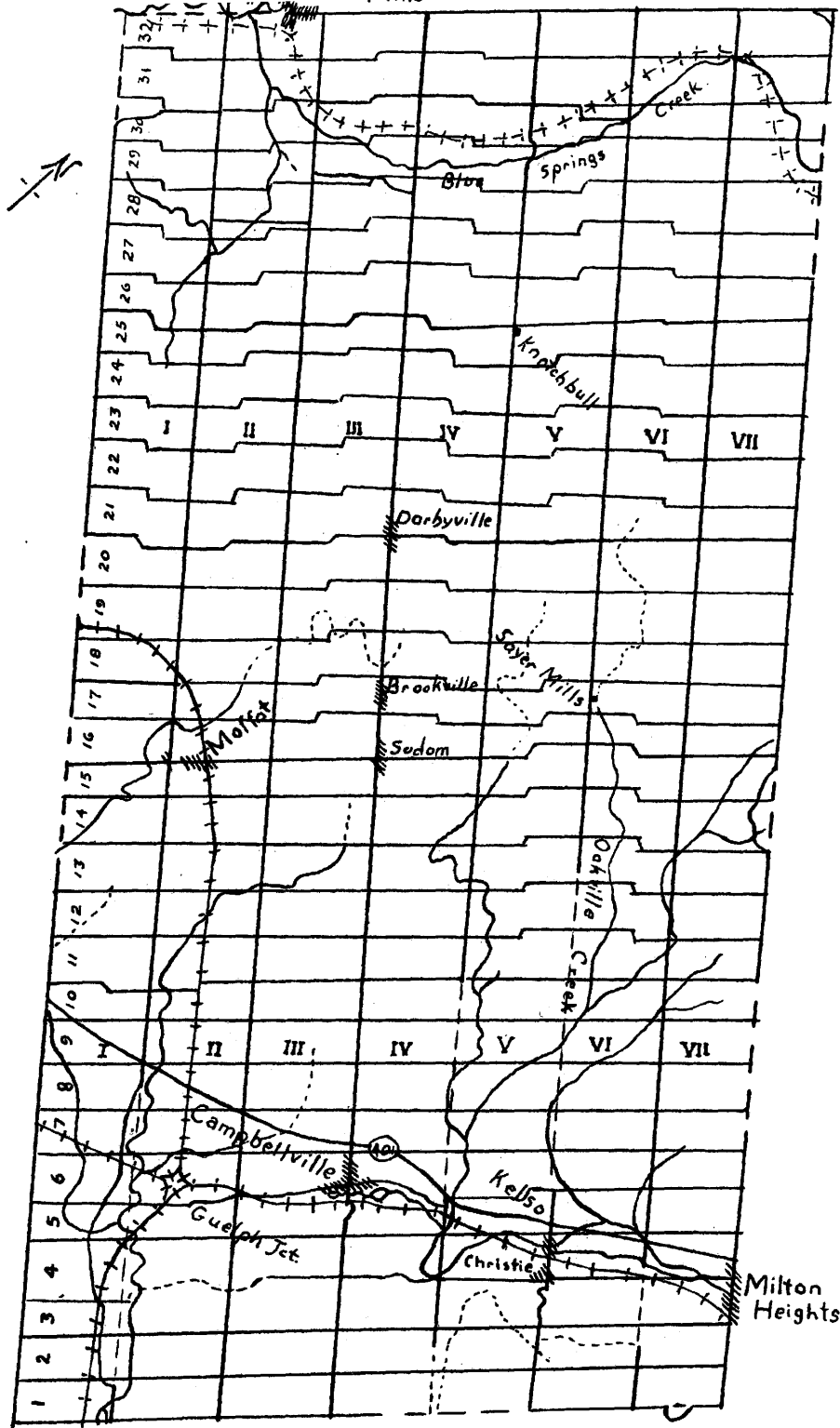
to the south and Guelph is five miles to the west. A circle with a fifty mile radius, drawn from the centre of Halton County would enclose one-half of the population of Ontario, roughly one and one-half million people. \*1

In spite of its location, Nassagaweya, for the most part, is a forested backwoods township. This characteristic is further emphasized by the lack of large urban communities. Campbellville, the largest village, has a population of only 364. Yet, just beyond the boundaries of the township there are some large urban towns such as Guelph, Milton, Georgetown, and Acton.

The best way to introduce anyone to Nassagaweya is to take a quick trip through the township travelling up the Guelph line, the main artery of communication in this area. Approaching the southeastern boundary, we climb up a half buried escarpment which is heavily forested but shows occasional outcrops of limestone. As we cross the township line we find good farms spreading over rolling country. These farms have large sturdy barns and brick houses. Going north, the land becomes progressively less rolling and the houses and barns are more modest. Because this is the main road of the township we find a scattering of low cost urban development spreading along either side of the road where the land values are low.

Rounding a sharp bend, we find ourselves looking over a spillway valley at the head of a large re-entrant in the Niagara escarpment. Below us at the foot of a short but steep grade lies the police village of Campbellville

\*1 Halton Chamber of Commerce, The County of Halton, a pamphlet, 1948.



**NASSAGAWEYA**  
**TOWNSHIP**  
 SCALE: 1 in. = 1 1/2 mi.

Concession Lines I - VII  
 Lot Lines 1 - 32

sprawling along the intersection of the Guelph line and Number 5 side road. As we descend into this valley, we cross the double line of the C.P.R., then an earthen dam which backs up a small tributary of the Oakville Creek forming a small pond which once provided waterpower to the original saw mill on this site. The community is typical of any cross road hamlet, located where the only two hard surfaced county roads in the township intersect.

The opposite side of this spillway valley rises more moderately and at the top of the hill at the north end of the village we come upon the modern clover leaf interchange where the Guelph line crosses Highway 401. Here we get an excellent view of the valley to the east and the stone face of the escarpment at the mouth of the re-entrant.

Continuing north, the land is gently rolling with many woodlots in the low lying areas. Off to the right the rugged limestone plain area is covered by the largest forest tract in the township. Along the road there are occasional limestone outcrops and the land is quite stoney. On the higher ground there are fine farmsteads. South of Sodom we climb the long slope of a large drumlin, the top of which offers an excellent view of the surrounding country. To the trained observer it is evident by the whale-back topography that we are in a drumlin swarm. Here the farms are large and of good quality. The houses are stone or brick.

The hamlet of Sodom, located on a cross roads in an interdrumlin depression consists of a general store, a few houses, and oddly enough, a war memorial. This is perhaps indicative of the hamlets former importance in the township.



Fig. 1.

Nassagaweya Township, as this photograph illustrates looking west from the escarpment at Kelso, is a forested backwoods area. Highway 401 can be seen in the background.



Fig. 2.

Nestled at the head of a deep re-entrant lies the police village of Campbellville beside the main line of the C.P.R.



As we proceed north from Sodom, the country is very hilly for we are now in the densest part of the drumlin swarm. Here we come rather unexpectedly upon the small hamlet of Brookville about a mile north of Sodom. The hamlet is unusual in that it is not located at an intersection. It consists of a general store, township garage, township hall, a modern township public school and a half dozen houses. Just outside Brookville to the north, the interdrumlin area is fairly flat and poorly drained. Wherever there is high well drained land the farms are of good quality.

Upon reaching Number 20 side road at Darbyville we have left the drumlin field. Darbyville is nothing more than a name on a map and a few crumbling stone foundations. North of Darbyville the land is broadly undulating with large well kept farms and fine old stone buildings. We climb gradually up the Galt moraine the ground becoming more steeply undulating with broad pockets of poorly drained land. Here we are at the drainage divide between the rivers that flow into the Grand River and those that flow into Lake Ontario. Woodlots and cedar swamps are common.

As we pass Number 25 side road to the west of Knatchbull, the land is quite hilly with many stones and boulders. The farms are still, in general, quite large and of good quality but there is a great deal more pasture here. At the edge of Blue Springs Creek spillway, the land dips down into the valley in three distinct terraces. The ground is very gravelly. In the valley bottom the peculiar pale blue creek is shrouded by a dense growth of cedar trees which extend up the spillway slopes to the till moraine at

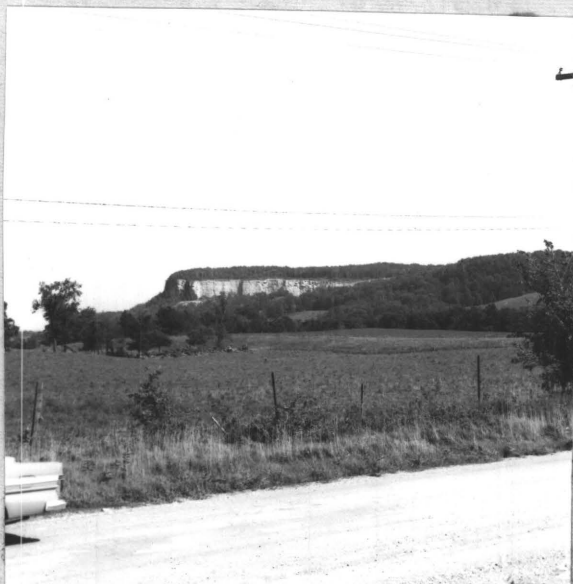


Fig. 3.

"To the east of Campbellville we have a fine view of the spillway valley and the stone face of the escarpment at the mouth of the re-entrant at Milton Heights."



Fig. 4.

"North of Darbyville the land is broadly undulating with large well kept farms on the Galt moraine."

the top.

From the creek to the northwestern limit of the township at the Eramosa line, the land is gently undulating with many boulders and stones. There are occasional hummocky patches of sands and gravels. This is part of the Paris moraine. The quality of the farms is various in this area dependent on the existence and extent of this gravelly outwash and kame material.

(11) Bedrock Geology:

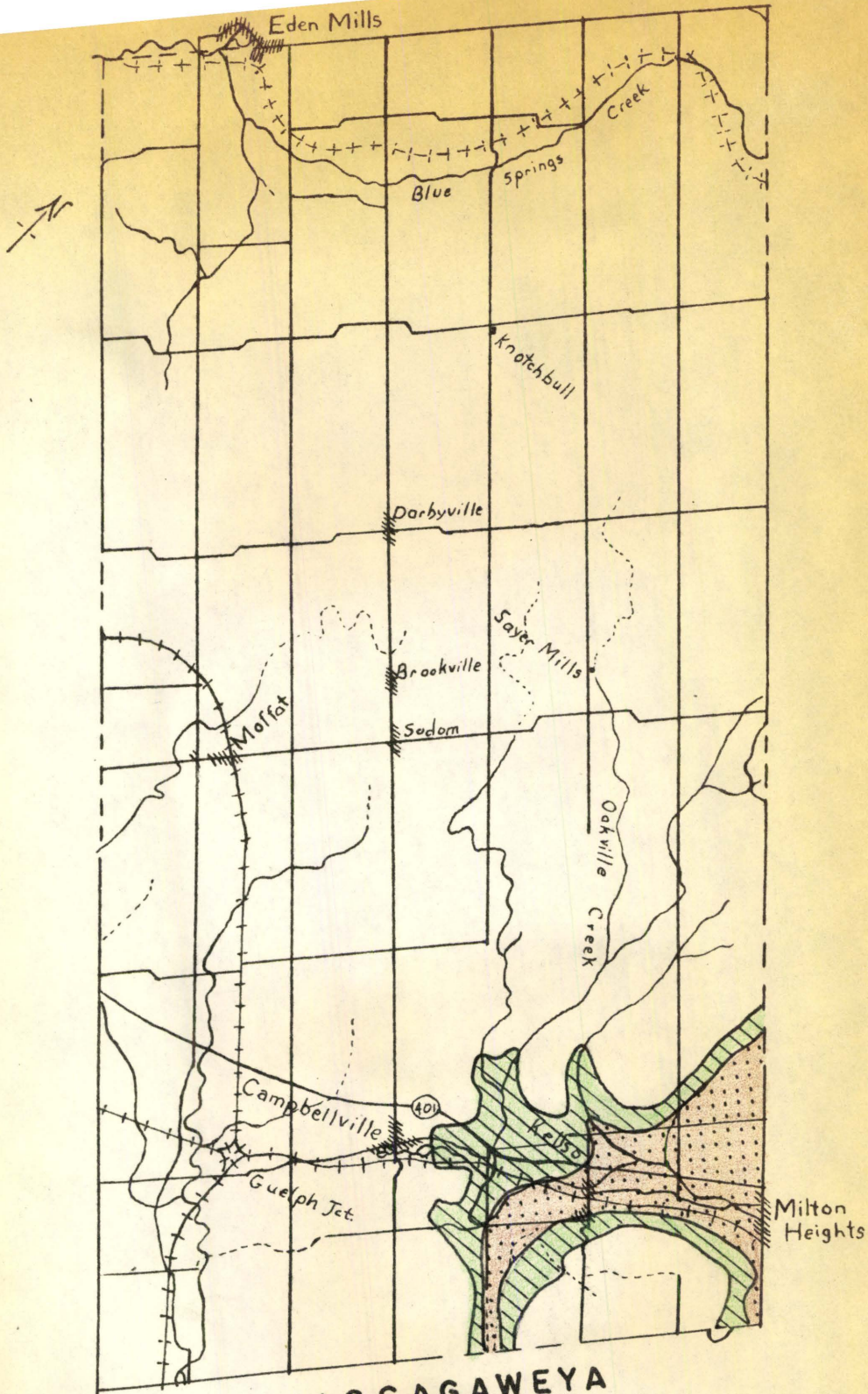
The geologic history of Nassagaweya Township, like most of Southern Ontario, dates back to the Paleozoic Era when thick beds of sediments were deposited in a great epicontinental sea. The bedrock is composed of Lockport and Medina formations of Silurian age and Queenston shale of Ordovician age.

Most of the township rests above the Niagara escarpment. At the eastern corner a sizeable re-entrant in the escarpment has been cut back towards Campbellville. Above the escarpment the bedrock consists of Lockport dolomite; a thick series of magnesian limestone commonly light grey to bluish in colour, fine to coarsely crystalline structure and disposed in beds from two to four feet thick.

The Lockport formation lies directly on the Medina formation. The Medina formation comprises white, grey and red Whirlpool sandstones; red, green and grey shales; and argillaceous limestone.

The Medina formation rests on a very thick deposit of Queenston shales. This formation is brick-red in colour,





**NASSAGAWEYA**  
**TOWNSHIP**  
 SCALE: 1 in. = 1 1/2 mi.

**GEOLOGY**



Queenston Formation.  
 red, in part sandy shale



Medina Formation. green, grey & red shales -  
 white, grey & red sandstone



Lockport Formation.  
 light grey dolomite

After J.F. Caley  
 Geological Survey





Fig. 5.

Lockport dolomite, a thick series of grey magnesian limestones underlie the major part of Nassagaweya and form the cap rock for the Niagara escarpment seen here in a limestone quarry. It is a valuable source of stone and lime.



Fig. 6.

Thick beds of Queenston shale are found at the base of the escarpment. Here the red shales with green banding are mined for baking bricks.

thinly bedded and remarkably uniform in character showing little or no variation. The shales are seamed by narrow greenish bands produced by chemical weathering along joint lines.

The Niagara escarpment is the product of differential erosion of the sedimentary rocks warped up around the Ontario dome in east central Ontario. Because of this warping the sedimentary strata in Nassagaweya Township dip approximately 20 feet to the mile towards the southwest. The prodigious erosive force of glaciers is believed to be responsible for carving the re-entrant into the escarpment at Milton Heights and isolating a large outlier, the southern portion of which is known as Rattlesnake Point.\*<sup>1</sup> The escarpment is an important factor in the land use pattern of the township, causing difference in physiography, soils, and to a slight degree, climate.

The Lockport formation which underlies the major part of the township is by no means level or flat lying. Outcrops indicate that the surface rock has been grooved and polished by glacial action, but more conspicuous are numerous small folds or anticlines which rise as much as 20 to 30 feet above the normal surface. The axes of these folds trend north-south. Such features can be identified only on the limestone plains where the glacial drift is shallow. The remainder of the township is covered by a mantle of glacial drift of varying thickness so that the present surface does not express the structure of the underlying bedrock. However, much of the

\*1. Karrow, P.F. Pleistocene Geology of the Hamilton Map Area, Ontario Department of Mines, Circular #8, 1959.



Fig. 7.

This crumbling outcrop of Lockport dolomite shows the folded nature of the bedrock.



Fig. 8.

These old lime kilns made use of the Lockport dolomite which is well adapted for burning to quick lime. They are found at the base of the escarpment at Kelso.

glacial drift is composed of limestone and shale debris plucked from the escarpment by glaciers during the glacial period. The soils of the township have been formed out of this glacial drift, and in this way the bedrock has contributed to the soil types.

The sedimentary bedrock of the township is of unusual economic importance. Some of the beds of the Lockport dolomite are well adapted for burning to quick lime and this product has been used in the past for fertilizer, bug-killer, and cement. These rocks have also been an important source of building stone. There are many fine old stone farm houses some of which are being converted into country homes. The Queenston shale outcrops in this township are especially suited for the manufacture of wirecut bricks and drain tile. Its accessibility and homogeneous character makes it easy to mine and crush. Today the limestone and dolomite rocks are the source of three very large stone crushing quarries.

### (iii) Glacial History:

During recent geologic time in North America, there have occurred four distinct glacial ages within the Pleistocene epoch. Evidence of the first three glaciations, the Nebraskan, Kansas, and Illinoian, has been largely obscured by the more recent Wisconsin ice age. Some 20,000 years ago, under the impress of a warming climate, the Wisconsin ice sheet began to recede leaving a great variety of glacial landforms which cover virtually all of Southern Ontario. The great volume of water released by the melting ice created a number of large glacial lakes which formed in the basins of the present

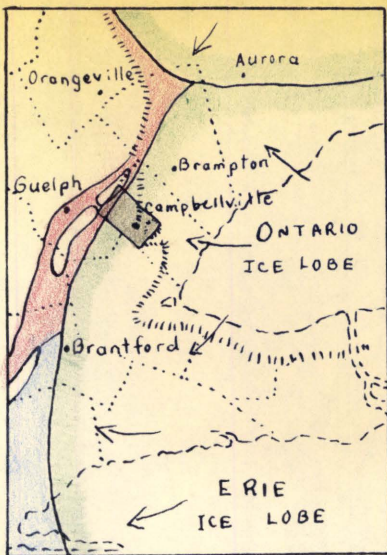


Great Lakes, but at much higher levels. Because of its extreme geologic youthfulness, the infinitely slow agents of landform denudation have not yet had time to modify the Wisconsin landscape to any appreciable degree. Therefore most of the landforms throughout this study area are primarily the result of Pleistocene glaciation, with the exception of the Niagara escarpment.

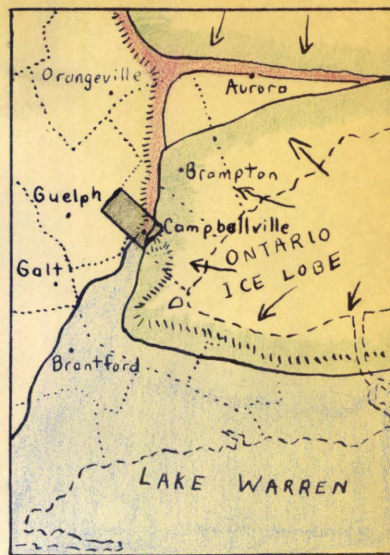
The surficial deposits of glacial, glaciofluvial, and glaciolacustrine origin are genetically related to the advance and retreat of the Lake Ontario lobe of the Wisconsin ice sheet. The westward advance of this thick sheet of ice had devastating effects on the Niagara escarpment, wedging into valleys and crevices and plucking bedrock from the rim. This repeated attack of glaciers during the Pleistocene epoch is believed to be responsible for the re-entrant at Milton Heights. Once over the edge of the escarpment the glacier left a scoured and polished bedrock surface now evident in the limestone plain area of the township. The debris from around the Niagara escarpment ranging from pulverised rock to large boulders was carried by the ice and deposited in a series of morainic hills around the "Ontario Island". A number of drumlins were formed during this glacial advance. Members of the Guelph drumlin field are found in a swarm around Sodom.

When the Lake Ontario ice lobe lost its momentum and began to decay, its retreat was hesitant, resulting in a number of recessional moraines. During this early stage of retreat as illustrated in diagram (i), the Paris and Galt moraines were deposited. A large melt water channel or spillway was formed along the ice front. A part of this

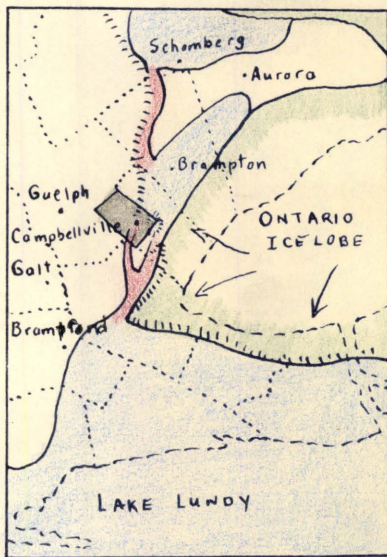
RETREAT OF THE WISCONSIN GLACIER.



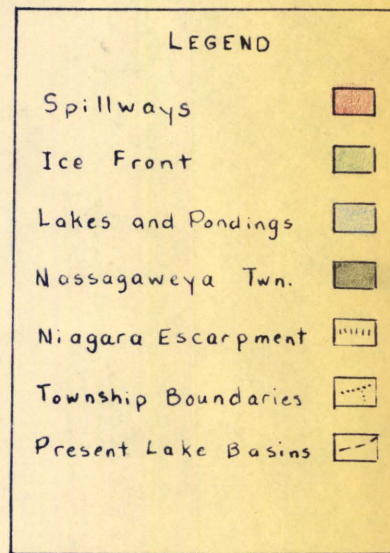
(i) LAKE WHITTLESEY STAGE



(ii) LAKE WARREN STAGE



(iii) LAKE LUNDY STAGE



These maps are based on Chapman and Putnam's "Recession of the Wisconsin Glacier." County boundaries have been added and a few minor changes have been made to correspond with findings in Nassagaweya Township.

Illustration

spillway system can be found today in the valley of the Blue Springs Creek which flows between the Galt and Paris moraines.

After the Galt moraine was built, the ice front retreat was speeded up for a period, leaving a sporadic cover of ground moraine which in some areas was washed away by glaciofluvial action. The ice front again came to rest for a period of time northeast of Campbellville where it formed a spillway channel between the ice and the escarpment front as seen in diagram (ii). This spillway carried melt water into glacial Lake Warren which extended as far north as Campbellville and drained westward into the Mississippi Valley.\*1

The ice front gradually withdrew from the escarpment northeast of Campbellville trapping water in the depression between the ice front and the escarpment forming the Peel Ponding. These waters were further augmented by spillway drainage from the Schomberg Ponding. In the early stages, the outlet for the Peel Pondage was through the Milton Heights re-entrant and then to Lake Lundy, a lower level of Lake Warren which now drained to the east through the Finger Lakes of New York State. As the ice front withdrew further from the escarpment the Mount Nemo re-entrant was opened and probably became the main spillway for the drainage of the Peel Ponding to Lake Lundy.

With the disappearance of Peel Ponding, glacial activities affecting Nassagaweya Township came to an end. Details of the physical features formed as a result of Pleistocene glaciation and to a minor extent, post-glacial

\*1 Chapman & Putnam, Wisconsin Glacier. Royal Society of Canada, 1949. P. 41.

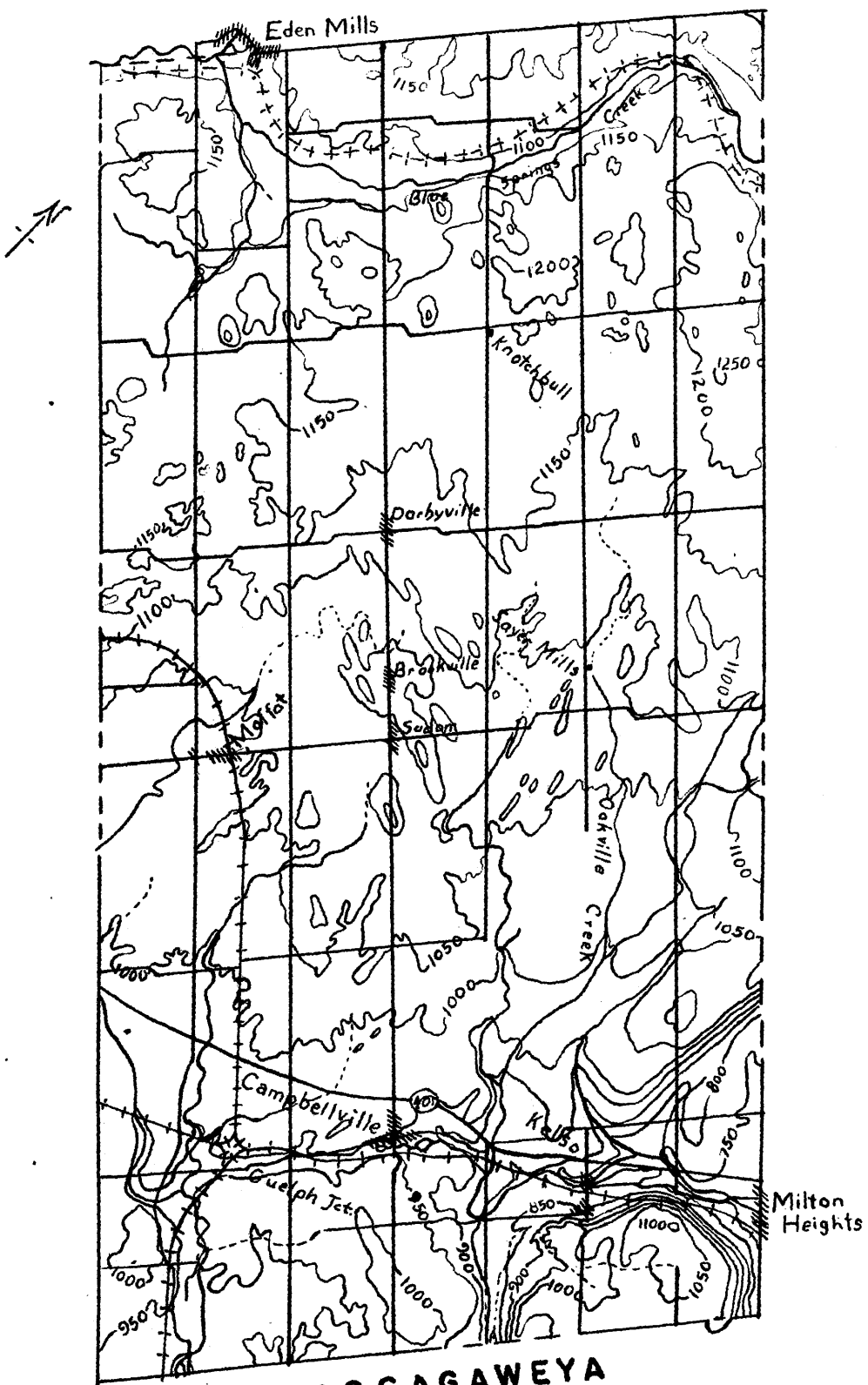
erosion and deposition in the township are given in the next section.

(iv) Physiography:

As stated earlier the physiographic map produced by L.J. Chapman and D.F. Putnam has been used as a base map in studying the physiography of Nassagaweya Township. However, because of its generalized nature, it has been necessary to make a number of revisions. These are based on personal observations, soil, and topographic maps. The map presented in this thesis is still a fairly generalized map. No detailed physiographic map exists for the township and it is not within the scope of this thesis to set about preparing one. Any detailed physical features that were observed will be described with the characteristics of the physiographic diversions. For a realistic interpretation of the physiography of the township the reader is referred to the block diagram.

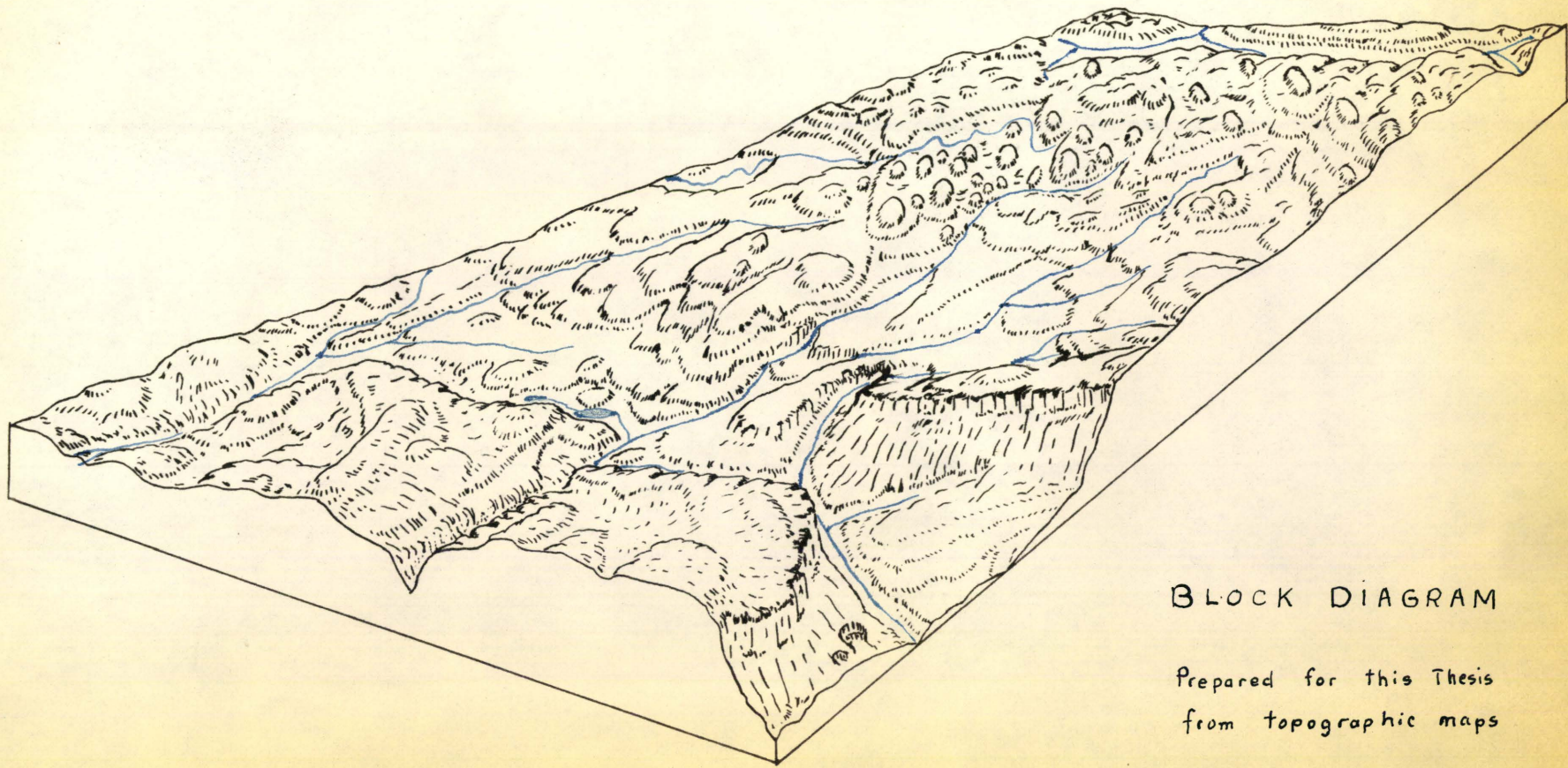
Recessional Moraines: The Galt and Paris moraines, examples of ice front deposition, extend through the northern  $\frac{1}{3}$  of the township. These two systems parallel each other and are usually separated by a two mile wide outwash plain, but here they are within  $\frac{1}{2}$  mile of each other, separated only by a narrow spillway channel. The Galt moraine is a fine example of morainic topography. It is a mass of glacial deposits approximately 100 feet thick and three miles wide. The highest elevation in the township, 1250 feet, is located on the northeastern section of this moraine. As a result, it is the drainage divide between the





**NASSAGAWEYA**  
 TOWNSHIP  
 SCALE: 1 in. = 1 1/2 mi.

**CONTOUR MAP**  
 Interval 50'

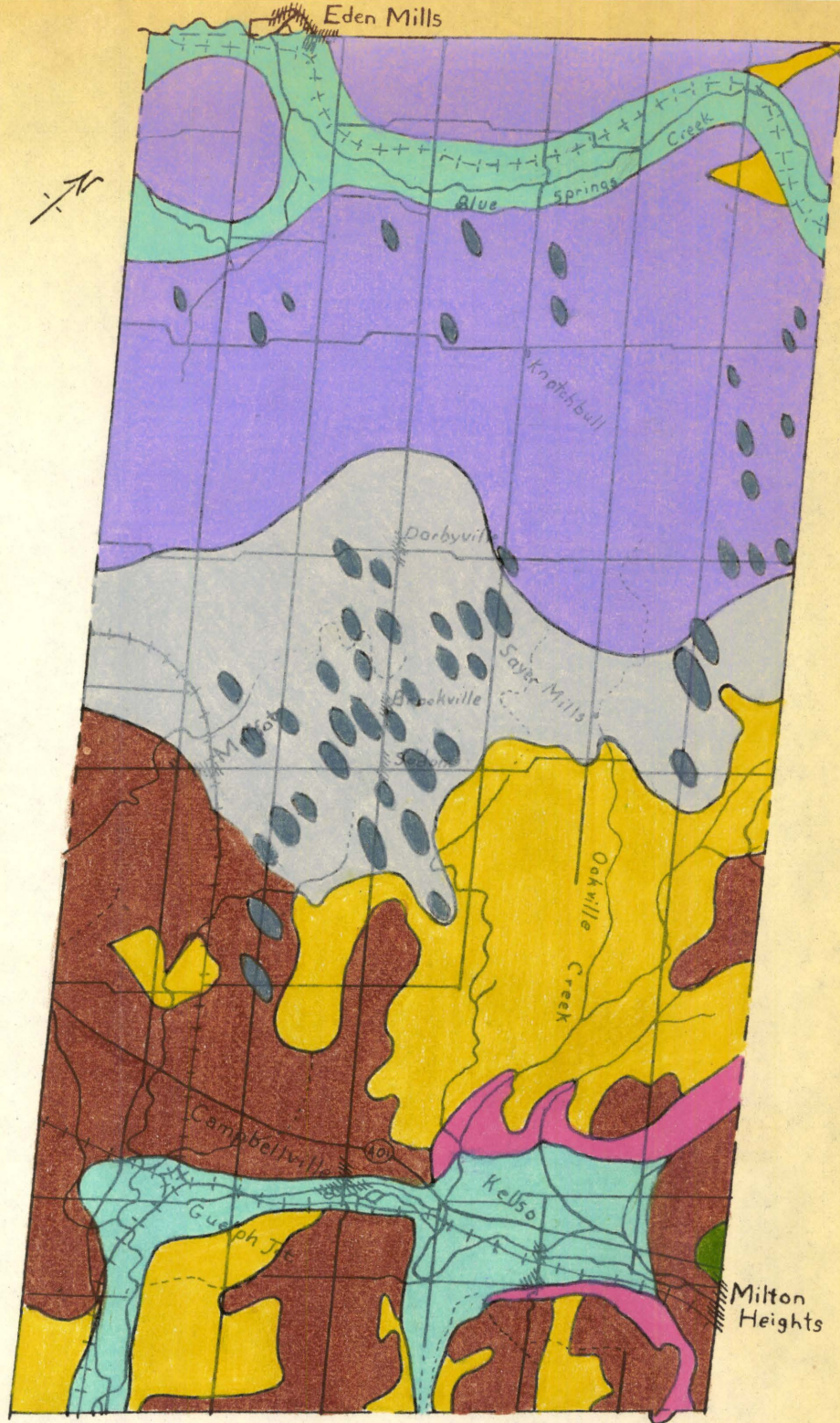


BLOCK DIAGRAM

Prepared for this Thesis  
from topographic maps

NASSAGAWEYA  
TOWNSHIP





## NASSAGAWEYA

TOWNSHIP

SCALE: 1 in. = 1 1/2 mi.









PHYSIOGRAPHY		
End Moraine		Spillway 
Drumlinized Till		Escarpment 
Ground Moraine		Bevelled Till 
Limestone Plain		Drumlins 





Fig. 9.

An example of the rolling topography of the Galt moraine (Con. 1, Lot 23). Notice the extensive forest cover and the abundance of pasture land use. (omit last 2 words)



Fig. 10.

A hummocky section of the Paris moraine (Con. 1, Lot 29). Notice the abundance of stones. At best it makes only poor pasture.



Grand River and Lake Ontario. The rugged landscape results in a lot of poorly drained depressional areas. The topography varies from gently undulating at the foot of the moraine to steeply rolling and hummocky at its crest. It is composed of coarse stony till with many boulders. The Paris moraine is similar to the Galt moraine but has more features common to stagnant ice. There are extensive kame deposits in Concession 4 Lot 32, and an esker in Concession 6 Lot 32. Typical rugged, hummocky, moraine features are found on the island of moraine south of Eden Mills and in the northeastern corner.

The landscape of the moraine is characterized by a great deal of forest and poorly drained land particularly on the Galt moraine. It is difficult to achieve prosperous agriculture on the rough bouldery terrain and there is a great deal of fallow, pasture, and idle land. The areas of good farms are associated with the more gently sloping topography and finer till deposits at the foot of the moraine.

Drumlinized Till: This physical category was created for the purposes of this thesis as a means of distinguishing between the moraine and drumlin areas. The drumlinized till area has topography, soil, and land use characteristics quite distinct from any other physical region in the township. In Chapman and Putnam this area was classified as a limestone plain with drumlins. This is wholly unsatisfactory because the bedrock rarely shows through and the soils are among the best in Ontario. This region includes an area of rolling topography with some swales centred around a drumlin swarm. The east-west lineation of the drumlins indicates the direction of ice advance. The glacial drift consists of a medium



Fig. 11.

The only esker identified on the township is on the Paris moraine (Con. 6, Lot 32). Notice the stony nature of the crest of the esker where the soil cover is thin.

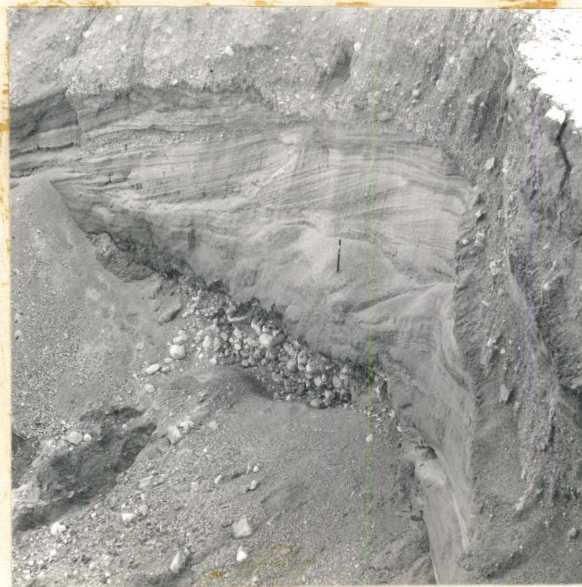


Fig. 12.

The Paris moraine has features associated with stagnant ice. Here is an example of sandy Kame in Con. 4, Lot 32.



textured limestone till. The inter-drumlin areas are often poorly drained.

The drumlin area is intensively cultivated. The medium textured till is easy to work, and the drumlin slopes are not prohibitive to agriculture if properly used. However, the poorly drained inter-drumlin areas tend to fragmentize the field units and disrupt the economic land use.

Ground Moraine: Ground moraine covers much of what was formerly classified as limestone plain in the southern half of the township. It was found necessary during field research to distinguish between those areas which had very shallow overburden or none at all from those that had sufficient overburden to develop a normal soil profile and support agriculture. The term ground moraine was chosen for this category because it best describes this irregularly scattered till of various depth. \*1 The texture of this till is varied. It ranges from bouldery till with many bedrock outcrop on the margins of the limestone plain to clayey or silty till in the vicinity of Milton Heights, both above and below the escarpment. The latter is called Halton till. \*2 The ground moraine southeast of Campbellville, in the northwest adjacent to the drumlinized till, and to the southwest of Guelph junction, consists of a sandy till known as Wentworth till. \*3 There are also some irregularly stratified sand and gravel kame deposits just north of Campbellville. In general the topography is rolling to hilly with frequent

\*1 Gilluly, J., Waters, A., Woodford, A., Principles of Geology, (San Francisco 1957), 304.

\*2 Karrow, P.F. - op. cit.

\*3 Karrow, P.F. - Ibid.





Fig. 13.

An inter-drumlin marsh at Sodom. Although small in size, such features tend to fragment the field units and disrupt the land use.



Fig. 14.

An example of the poorly drained white elm forest common to depressions in the limestone plain area.



stones and boulders. Because the bedrock is close to the surface, the drainage channels are very marshy and there is a great deal of swamp.

The land use of this area depends on the depth and texture of the overburden. Forest and cedar-elm swamps exist where the drift is shallow and the drainage is poor. The better drained land on finer textured overburden is most intensively cultivated.

Limestone Plain: Fragments of the limestone plain outcrop throughout most of the southern half of the township. The largest single tract is located just above the escarpment north of Campbellville. A second large section of limestone plain can be found in the southern corner of the township. The glacial drift is very shallow in these areas and bedrock outcrops everywhere. It is not literally a plain because of the rugged and warped surface created by erosional irregularities and folds in the bedrock. Large limestone erratics lie all over the surface. There are many poorly drained areas in hollows and depressions.

The limestone plain stands out on the land use map as a large forested area. There is no cultivation carried out here but there are a few clearings of unimproved pasture and idle land.

Spillways: The spillway of the Blue Springs Creek valley, often referred to as the Acton spillway, separates the Galt and Paris moraines. Somewhat more than 1/2 a mile wide, it is a doubled terraced channel cutting through the moraine to the bedrock, a depth of one hundred feet. There are gravel and sand deposits along the terraces.





Fig. 15.

The Acton spillway with the Paris moraine in the background. Notice the cedar trees in the bottom of the spillway where the drainage is poor.



Fig. 16.

The Campbellville spillway as seen from the escarpment. The opposite side of the re-entrant is in the background. The large open cut to the left exposes sand and gravel deltaic deposits.



The Campbellville spillway was formed when melt waters were channelled between the ice and the escarpment. There appears to have been a small ponding of these waters in the Milton re-entrant before they drained southwest into Lake Warren. Evidence of this ponding can be seen in the formation of a large delta deposit  $1\frac{1}{2}$  miles northeast of Campbellville at a bend in the road. (See fig. 17). The foreset beds consist of well sorted silt, sand and gravel. There is an unusual unconformity at the top of these beds formed by a large deposit of poorly sorted boulders. The origin of this topset bed is a matter of conjecture but it seems most logical to this author that this boulder deposit was laid down after an ice dam broke releasing a great and prolonged rush of water capable of carrying such a load. Further support for this theory is found in a number of stone fences in the vicinity which consist of uniform boulders similar to those of the deltaic deposit. This suggests that a thin mantle of boulders was spread in front of the delta. Another theory suggests that the top of this delta was planed off by a resurgence of the ice front followed by a rapid retreat. This created a heavy run-off of melt water which resulted in the deposition of an outwashed boulder deposit.

In this thesis I have extended the Campbellville spillway to the west beyond the town following the valley which has a thin cover of gravel. This spillway drained into Lake Warren in its shallower stages and later into Lake Lundy. Its channel has been ascertained by a correlation of contour levels extending west from the re-entrant. There is a great deal of kame moraine in this spillway, particularly





Fig. 17.

A large deltaic deposit in the Campbellville spillway. Notice the foreset beds composed of well sorted sand, silt and gravel. Notice the unusual unconformity with poorly sorted boulders on top.



Fig. 18.

A poorly sorted glaciofluvial deposit in the Campbellville spillway, (Con. 3, Lot 4), consists of silt, sand and gravel. Notice the large erratics.



in the vicinity of Campbellville.

The land use of the spillway regions is a point of contrast. The Acton spillway is almost entirely overgrown with cedar trees. The Campbellville spillway, while it too has poorly drained cedar swamps to the west of the town, supports productive farms in the re-entrant valley to the east.

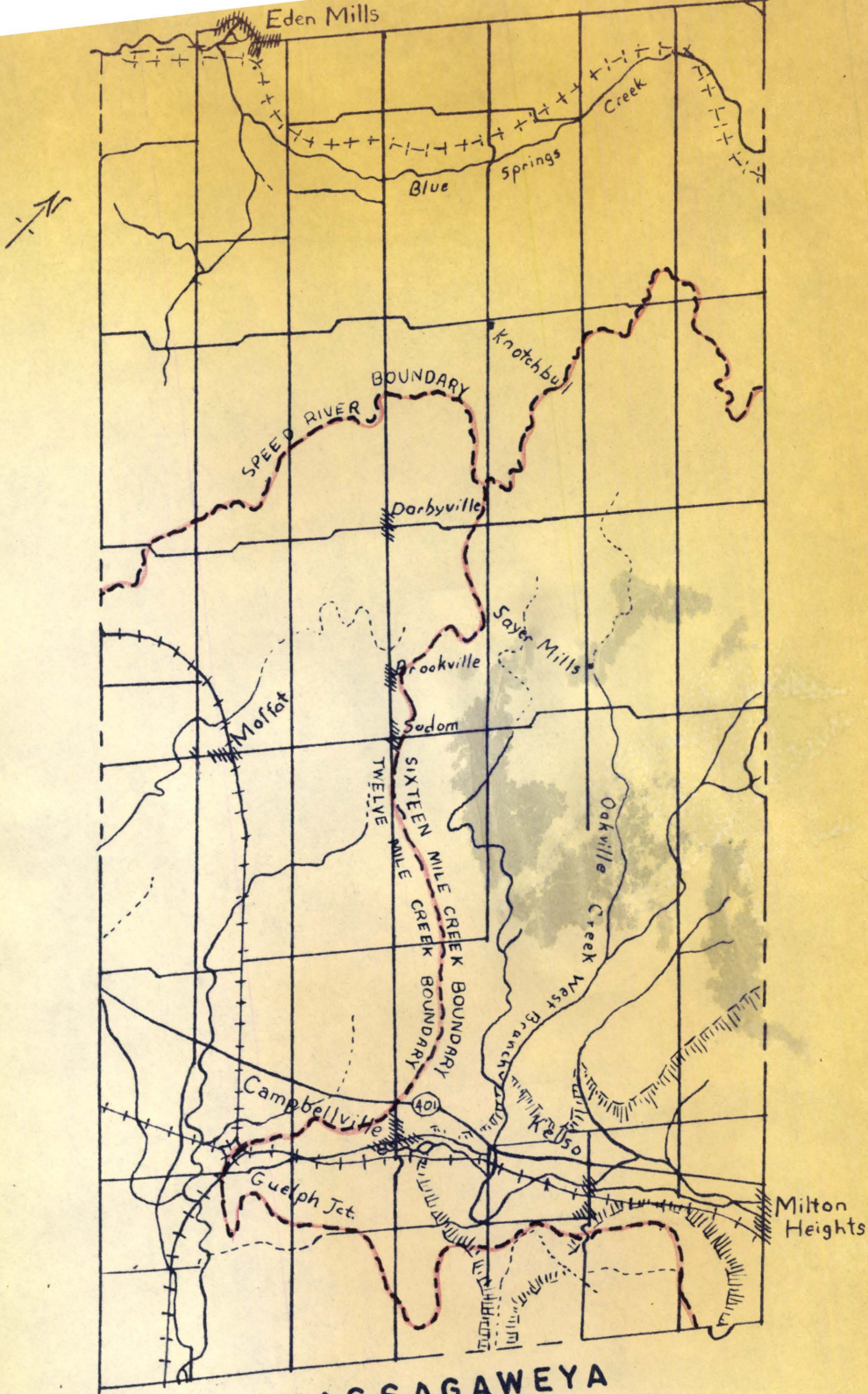
Bevelled Till: A small area of this landform type is found in the township near Milton Heights. It is associated with the Peel Ponding whose waters bevelled the till plain below the 750 foot contour level. This muddy, shallow, short lived glacial lake laid down a sheet of varved clays over the glacial till producing a level plain.

The effect of this on the land use is that the fields are large, regularly laid out and intensively used. This emphasizes the contrast in land patterns above and below the escarpment.

In general summary of the physical geography, it should be stated that the irregular and scattered agricultural land use, the lack of uniformity in field patterns and shapes, the degree of usefulness of the land and its backwood characteristics are the result of the physiography of the township. Such a landscape is not readily conducive to specialized or large scale farming.

(v) Drainage:

The drainage of Nassagaweya is divided between three watersheds. This is where the township derives its name.



**NASSAGAWEYA  
TOWNSHIP**  
SCALE: 1 in. = 1 1/2 mi.

- DRAINAGE**
- Watershed Boundary
  - ||||| Niagara Escarpment

Nassagaweya is an Algonquin Indian word for division of the waters.

The northern third of the township is drained by the Blue Springs Creek, a tributary of the Eramosa River which flows into the Speed River at Guelph. This creek flows across the northern part of the township in the Acton spillway, fed by short tributaries and springs in the Galt and Paris moraines. This drainage basin covers approximately 30% of the township or 20 square miles.

Of the southern two thirds of the township, which is drained to Lake Ontario, the eastern third is drained by the West Branch of the Sixteen Mile or Oakville Creek, and the western third by two small tributaries of the Twelve Mile or Bronte Creek.

The West Branch of the Sixteen Mile Creek drains 35% of Nassagaweya Township or approximately 25 square miles. This creek is characterized by many short small tributaries with a fairly steep gradient. The headwaters are in the Galt moraine at 1,300' above sea level. The largest single drop is over the Niagara escarpment at Hilton Falls. The gradient varies from twenty to ninety feet per mile. Forty-two percent of this drainage basin is forested. The majority of the streams are permanent with maximum flow occurring between January and May.

The tributaries of the Twelve Mile Creek also drains 35% of the township or approximately 25 square miles. One tributary rises one mile east of Moffat and drains southeasterly, and another rises in the drumlin field near Brookville and drains southerly into Fuslinch township. The





Fig. 19.

The Blue Springs Creek is fed by springs in the Galt moraine such as this one which is being tapped for domestic purposes.

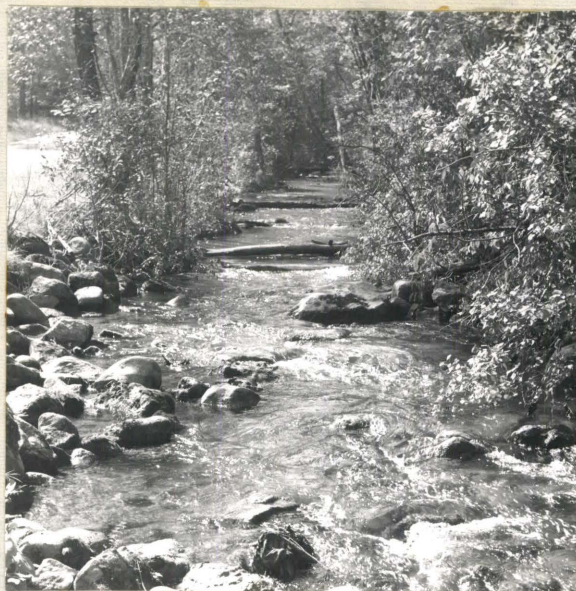


Fig. 20.

A view of the West Branch of Sixteen Mile Creek east of Campbellville. It is characterized by a fairly steep gradient.





Fig. 21. The West Branch of the Sixteen Mile Creek is the only continuous stream in the township which falls over the Niagara escarpment. Hilton Falls once served as a mill site.

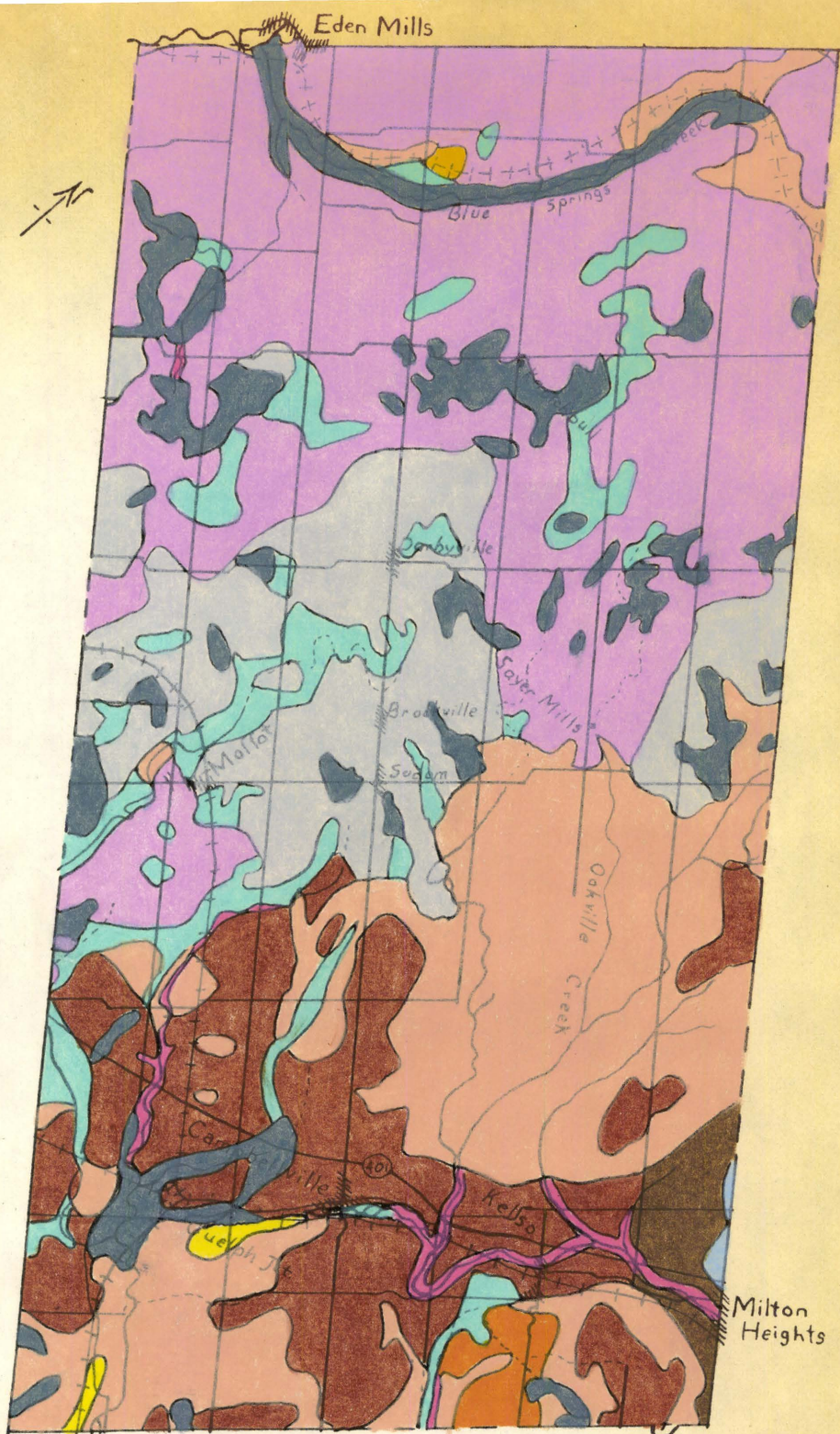
gradient of these streams is much less than those of the West Branch, being between 10 and 30 feet per mile. These streams, for the most part, have intermittent flow.

Certain features of the landscape are related to these streams. They are quite youthful so that there is a fairly large amount of poorly drained land on the interfluves. The contour map indicates that the stream eroded land forms, although not intensively developed, add complexity to the already compound glaciated landscape. A great deal of forested land is associated with these stream courses. In the past these streams served as a source of power for many saw mills. Today almost all of the recreational land use is found in conjunction with these streams, particularly the West Branch and the Blue Springs Creek. Their permanent flow and cool temperatures are excellent for Brook Trout. A church camp and a Boy Scout Camp are located on the Blue Springs Creek. There is a swimming pond at Campbellville, and a fishing pond just beyond the town. The Kelso dam project (See page 136) on the West Branch will soon provide a small lake for all recreational purposes, as well as serve as a flood control for areas further down stream. Last but not least, these streams and many springs provide abundant water for livestock on the farms.













#### (vi) Soils:

This study of the soils of Nassagaweya Township is based on the soil map of Halton County produced by the Ontario Soil Survey. No soil report has yet been published.





**NASSAGAWEYA**  
**TOWNSHIP**  
 SCALE: 1 in. = 1 1/2 mi.

SOIL MAP		
	Dumfries Loam	 Muck
	Ontario Loam	
	Farmington Loam	 Haldimand Clay
	Fonthill Loam	
	Lyons Loam	 Oneida Clay
	Guelph Loam	
	Fox Sandy Loam	 Oneida Silt Loam
		 Bottom land

After OAC Soil Survey

The soils of Nassagaweya Township have been formed by the action of a moist, cool, temperate climate and a covering of a mixed forest vegetation. Consequently, podzolization has been the principal soil forming process. Almost all of the soils belong to the Grey Brown Podzolic Great Soil Group. However, various soil differences do occur locally as a result of the depth, nature, and texture of the glacial drift and soil drainage. Therefore, the soils correspond closely to the physical regions of the township and shall be discussed in that way.

Dumfries Loam: This soil, like most of the soil in the township is a member of the Grey Brown Podzolic Great Soil Group. It has developed on the grey coarse, stony, limestone and shale till with many large stones and boulders that comprises the Galt and Paris moraine. The till is composed mostly of Lockport dolomite from the Niagara escarpment, and has been deposited in varying depths creating a hilly topography with many depressions. The drainage is generally good. The soil profile consists of a greyish brown loam over reddish brown and grey coarse stony loam. The fertility needs of this soil are organic matter, phosphate, and potash.

The stones and boulders which occur throughout this profile interfere with cultivation and the hilly slopes are susceptible to sheet erosion. The irregular slopes prohibit such conservation practices as contour plowing so that long rotation should be used to prevent erosion. The steeper slopes should be, and usually are, left in permanent cover. This soil series is used like the rest of the soils in the





Fig. 22.

A typical soil profile in the stony grey brown podzolic soils of Nassagaweya Township. This is an illustration of the excessively stony Dumfries Loam, Con. 4, Lot 28.

township for general farming. Fodder grain and hay crops are the main cultivated crops. A very large percentage of the land is in forest or permanent pasture.

Guelph Loam: The Guelph loam is a Grey Brown Podzolic soil developed on medium textured limestone till. It is characteristic of the drumlinized part of the township. The topography varies from gently rolling to hilly. The natural drainage is fair to good. The soil profile consists of a greyish brown loam over reddish brown and grey stony loam. Underlying this is a brown clay loam in a zone of mineral accumulation. The unweathered parent material consists of a light grey loam till which is moderately stony with frequent boulders. The fertility needs of this soil are phosphate, organic matter and potash.

The regular hilly topography with its smooth slopes means that normal farming practices can be carried out and erosion is slight if proper conservation methods are used. This type of soil is amongst the best agricultural soils in Southern Ontario. It is the most intensively cultivated soil in the township aside from the silty clay of the Peel Ponding. Grain, hay, corn and root crops are grown in a mixed farming economy. Woodlots are confined to the poorly drained depressional area. Most of the pasture area is improved or in rotation.

Ontario Loam: This soil series is found on the ground moraine deposits of the southern part of the township. It is derived from a medium textured shale and limestone till, the surface of which is often sandy. The topography varies from gently rolling to hilly. The natural



drainage is good except for depressional areas and stream channels. The soil is often shallow and bedrock outcrops are common. The soil profile consists of a light brown loam over reddish brown and grey stony loam. Stones and boulders are very frequent. The fertility needs of this soil are the same as the Guelph loam.

The stony nature of these soils is often a problem but when cleared, they are productive. However there is a large proportion of forest and swamp in depressional areas where the overburden is shallow. The cultivated areas produce tree fruits and small fruits, fodder grains, hay and root crops.

Farmington Loam: This soil belongs to the Brown Forest Great Soil Group. It has developed on the limestone plain where the glacial drift is very shallow. The topography is generally undulating and the drainage is only fair. Low lying areas are poorly drained and often have water at the surface. The soil profile consists of a shallow dark brown stony loam over bedrock. There are many stones and large boulders.

Forestry is the chief use of this soil series. There is some grazing on rough pasture during the spring and fall, but large acreage is required to be effective. The soil dries out quickly in the summer months and the carrying capacity for livestock is low. Crop production is prohibited by this droughty condition and the shallow stony nature.

Oneida Clay Loam: This Grey Brown Podzolic soil occurs on fine textured shale limestone till which is

undulating to gently rolling. The soil profile consists of greyish brown clay loam over yellowish brown clay loam and dark brown clay over grey stony clay. There are occasional stones and boulders. Phosphate and organic matter are the fertility needs of this series.

This soil is very intensively cultivated with wheat, oats and hay. Pasture is limited to the steepest slopes and stream valleys. There is very little forest vegetation.

Oneida Silt Loam: This soil is that member of the Oneida series which occurs above the escarpment on medium textured limestone and shale till with rolling and hilly topography. The soil profile is a light silt loam over reddish brown and grey stony clay loam with occasional stones and boulders. The map area of this soil is small but it is intensively cultured, and is similar in land use to the Ontario loam.

Lyons Loam: This soil belongs to the Grey Gleisolic Great Soil Group. It is found on every major physical land type of the township. It is characterized by a smoothly undulating to flat topography with poor natural drainage. The soil profile consists of a dark brown loam over a greyish brown mottled loam on a brown calcareous stony till.

This soil accounts for a great deal of the forest land in the better agricultural areas. It is occasionally pastured.

Muck: This is a bog soil which occurs throughout the township on flat depressional topography with poor natural drainage. It consists of black partially decomposed plant material of varying depth over sand, clay or marl.

It is covered in elm and cedar swamp.

Three other soil series exist in the township but are of minor importance and small in area. They are, alluvial bottomland soils found along drainage channels, Haldimand clay of the Peel Ponding, and Fox sandy loam and Fonthill loam found on small outwash and river deposits of sand and gravel.

In summary, it can be said that the first class soils are Guelph loam, and in part Dumfries loam, as well as the Oneida clay. The second best soils occur on the rougher sections of the Dumfries loam and the Ontario loam. The worst soils in the township are found on the Farmington loam, Lyons loam and muck. The soils are closely related to the physical regions of the township, but while the physiography controls the shape and pattern of the land use, the soil controls its character and intensity.

(vii) Vegetation:

Nassagaweya belongs to the Huron-Ontario Section of the Great Lake-St. Lawrence Forest Region.<sup>\*1</sup> The climax vegetation type of this region is the sugar maple and beech association. Also in conjunction with this type on the better drained lands are basswood, yellow birch, hemlock and white pine. Black ash, white elm, and red maple, in addition to white cedar occupy the swamps and other poorly drained lands.

\*1 Halliday, W.E.D., A Forest Classification for Canada.  
Forest Service Bulletin. 89.

Good early descriptions of the forest of Southern Ontario are rare, for the early settlers regarded the forest more as an obstacle to cultivation than a positive asset worthy of recording. However, a fairly good picture can be constructed from information that does exist. Such early concern as there was with timber resources centred around pine and oak for the British navy and easily cut softwoods for building purposes. The early surveyors were instructed to record the forest timber in their field books. This provides us with a dependable early account of the forest types in pre-settlement days before the land was cleared. S. Ryckman and R. Sherwood, who surveyed the township, described the original forest as consisting of maple, oak, birch, beech, pine, ash, and basswood trees, with many cedar swamps. For example Lot 3, Concession 7, was described as a fine maple and beech forest intermixed with large pine trees. An excellent account of the early forest of the township has been given by Joshua Norrish in his History of Nassagaweya,\*1 in which he writes,

"The mountain crossing it at the south-east end causes the land to be very uneven and very stony, some places solid rock and high precipices, but even this territory is getting to be valuable now. The timber in this part of the township was mostly pine up to the middle of the township and in some places a little above that. In some places there was a scattering of hardwood among the pine and some very good red and white oak. In these places the pine grew very large. I know of one tree that grew on Lot 20, in the -1st Concession, that measured two feet in diameter, ninety-five feet

\*1 Nassagaweya Centennial, 1850-1950, Acton Free Press, Acton, Ontario, 1950.



from the ground. This part of the township was very hard to clear. The hardwood consists of maple, beech, and some elm and basswood, there was also some hemlock in places, but a great part of it was destroyed before it became of any value; we have some white and black ash and a large amount of cedar swamp. In the upper end of the township there was some good rock elm, but the best of it was cut and shipped to Britain several years ago."

Thus we see that the natural vegetation of Nassagaweya was once of excellent commercial value. There existed in the past, as many as 18 saw mills in the township. Much of the forest was wastefully burned as a means of clearing the land by the early settlers. The fine white pine stands were cut down for naval stores. The hardwoods were burned for potash used in the soap and dye industry. Other demands came for forest products such as tanbark, lathwood, staves, shingles, pilings, ties, fence posts, wood for the carriage industry and fuelwood. All these uses, and the intensive cutting of the forest without any controlled reforestation had a profound effect on the face of the forest.

Until 1910 the felling of woodland was rapid. After that, the remaining woodland was left intact with some small increases. Today the overall forest cover of the township including swamps and natural pasture land has an area of approximately 15,000 acres or about 31% of the total area. Therefore the forest land use comprises the largest single land class in the township.

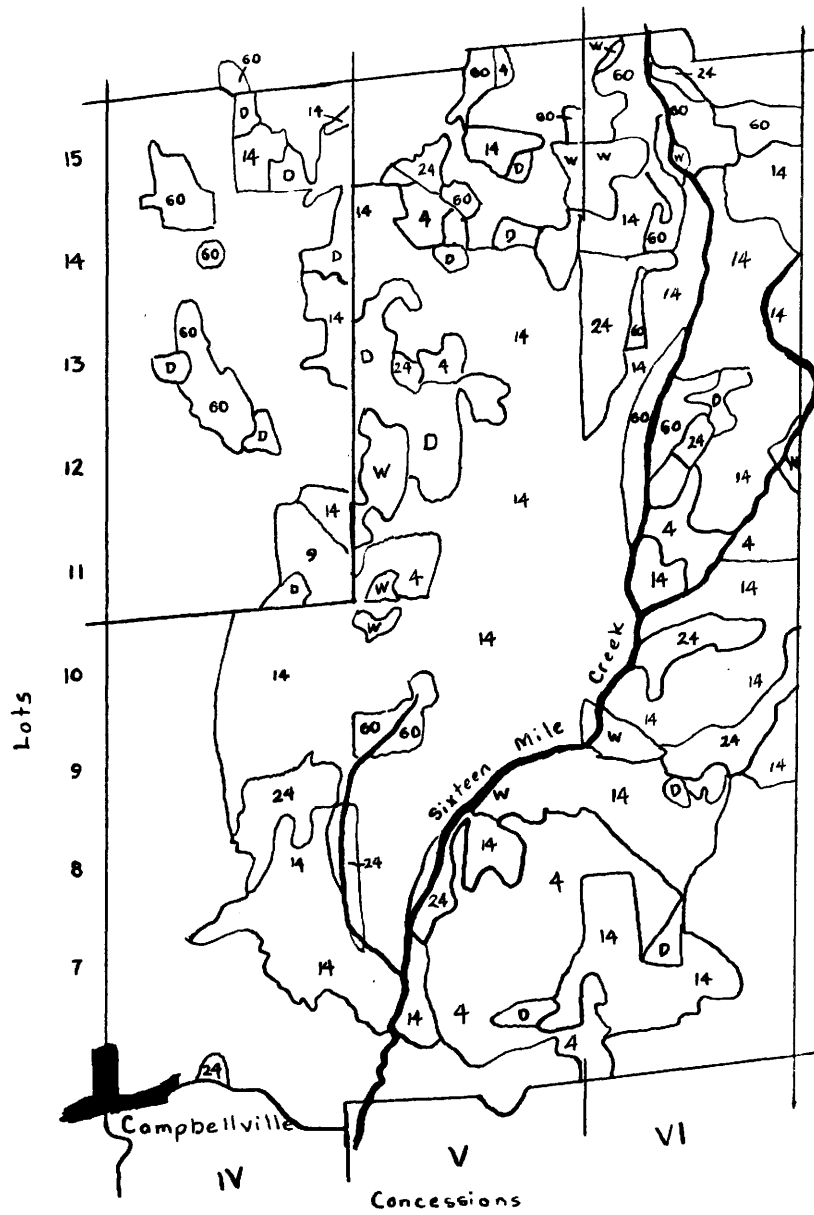
The following is a description of the forest associations of the three watershed divisions of the township. The statistics are based on the field work done by the

three conservation authorities mentioned earlier. A complete map of the forest types in the township has not been compiled and it is not within the scope of this thesis to prepare one. The watersheds discussed herein are only those parts within the Township of Nassagaweya. It should be noticed that the forest vegetation is strongly related to the physiography.

The Sixteen Mile Creek watershed in Nassagaweya Township has an area of 16,000 acres, of which 6,667 acres or 42% has a forest cover. There is a high percentage of forest here because most of this area is underlain by limestone plain. The percentage of forest types within this forest area are as follows; sugar maple 45%, white cedar 12%, white elm 10%, sugar maple-white elm 9%, aspen 8%, paper birch 8%, beech-sugar maple 6%, and less than 2%, black ash, basswood, white pine, hemlock, and black cherry. Wet and dry scrub is fairly abundant.

The sugar maple is the dominant vegetation in this area because it is the climax vegetation of this Ontario region. It has not been cleared because of the shallow rocky nature of the soil on the limestone plain.

It should be noted that the next three forest types are all associated with poor drainage conditions. Together they make up a total of 31% of the forest area. These three stand out because they occupy land that cannot be cleared for agricultural purposes. The white cedar is common on the muck soils of swamps where it is often associated with black ash, white elm and yellow birch. However, where lime is plentiful, white cedar extends to the droughty



SAMPLE FOREST BLOCK

LEGEND			
Pioneer Vegetation	4	White Cedar	24
White Pine	9	White Elm	60
Maple Sugar	14	Dry Scrub	D
Climax Vegetation		Wet Scrub	W

After Sixteen Mile Creek Conservation Authority





Fig. 23.

A sugar maple climax forest vegetation type on the well drained areas of the limestone plain.



Fig. 24.

A pure white cedar stand on the better drained parts of the limestone plain. This type is also associated with muck soils of poorly drained areas.

uplands where it tends to form pure stands. Since much of the watershed area is limestone plain, it explains why the white cedar is the second most numerous forest type in this area.

The aspen and paper birch forest types both go together because they are what is called a pioneer type, growing in after clearing or cutting operations, overgrazing or fire. These two together make up 16% of the forest area. These trees are of no commercial value and emphasize the need for reforestation on idle land. The hawthorne which invades overgrazed or abandoned clearings on the limestone plain and the willow scrub that springs up on wet pasture also indicates the need for reforestation.

The beech sugar-maple association is common because it is closely related to the climax type but has been severely reduced by clearing for agriculture land.

Notice that the white pine which was once very common in this area is less than 2% because it was severely cut over with no conservation methods employed.

The Twelve Mile Creek watershed also has an area of approximately 16,000 acres in the township of which 4,481 acres or 28% are forested. This is still a large forested area but much less than that of the Sixteen Mile Creek watershed. The percentage composition of the forests in this watershed is; white elm 16%, sugar maple 38%, silver maple-white elm 21%, beech-sugar maple 10%, aspen 9%, white cedar 8%, paper birch 3%, and hemlock, black ash, basswood, and white pine are all less than 2%.

The sugar maple and its associated types are again



dominant in this watershed. It is found on the shallow but well drained soils of the ground moraine that have not been cleared. The swamp forest type, white elm, white cedar, and silver maple-white elm make up 45% or almost half of the forest type. These types stand out so much more here than on the limestone plain because a lot more land has been cleared for agriculture leaving only the poorly drained areas in forest. The aspen and paper birch are again common but to a lesser degree, and the white pine is present but not very important.

The Speed River watershed consists of 12,800 acres within the township, of which 3,781 acres or 29% is forest cover. Although this watershed area is somewhat smaller than that of the Twelve Mile Creek, it has a slightly larger percentage of forest cover. This is because it is in the rougher moraine country of the northern part of the township. The percentage of forest types in this area are; white cedar 22%, aspen 19%, sugar maple 16%, silver maple-white elm 10%, wet scrub 8%, white elm 5%, and black ash, beech-sugar maple, and paper birch are all less than 5%.

It is significant to notice that white cedar is the most abundant forest type in this area, and along with its other associated wet forest types, silver maple-white elm, wet scrub, white elm and black ash, it makes up 50% of the forest cover. The reason for this is that there is a lot of poorly drained depressional land on the moraine. Moreover, the Acton spillway has one of the largest stands of white cedar forest in the township.

Aspen is the second largest forest type in this area. The reason for this is that the rough hummocky moraine





Fig. 25.

A fine stand of sugar maple on the stony shallow overburden of the ground moraine in the Twelve Mile Creek watershed. This forest has survived because it is not on good agricultural land.



Fig. 26.

A dry rocky pasture area is soon overgrown with weeds and hawthorns. Such areas are in need of reforestation.

surface should not have been cleared. Now that it has fallen into disuse this pioneer type of vegetation is taking hold. It prefers the well drained gravels of the morainic area. This area has been classified as one of the largest and most urgent reforestation projects in the whole of the Speed River watershed.

It should be also noted that the climax vegetation has slipped to third place mainly because of the over clearing in this area. The overburden is deep on the moraine and almost every well drained site has been cleared.

The last point that is rather distinctive for this area is the occurrence of the wet scrub type in a fairly large amount. This is usually a variety of willow bushes common to poorly drained pasture land. This is also indicative of overclearing. The overburden is deep, the soil is good, but poorly drained. Such areas, common to depression in the hilly moraine, should either be reforested or drained to make productive farm land.

In summary for the whole township, the forest cover type percentage is; sugar maple 33%, white cedar 14%, sugar maple-white elm 13%, aspen 12%, white elm 10%, beech-sugar maple 7%, paper birch 5%, wet scrub 2%, all others 4%.

Thus 40% of the township forests is made up of the climax vegetation and its other well drained land associates. The wet land associated forest types, white cedar, white elm, silver maple-white elm, and wet scrub also make up approximately 40%, and the pioneer type, aspen and paper birch make up 17%.

The vegetation types reflect the nature of the soil and the physical character of the landscape. All of the best land has been cleared as well as a lot of hilly stony land and poorly drained land that should have been left in forest. The extensive cutting over in the latter half of the 19<sup>th</sup> century changed the face of the forest, in all but annihilating such commercially valuable types as rock elm and white pine which were once locally abundant. Reforestation is very necessary to prevent the spread of useless pioneer forest types on hilly ground and wet scrub types on poorly drained cleared areas. Reforestation is also important in this headwater region to prevent flooding further downstream and to improve the summer stream flow.

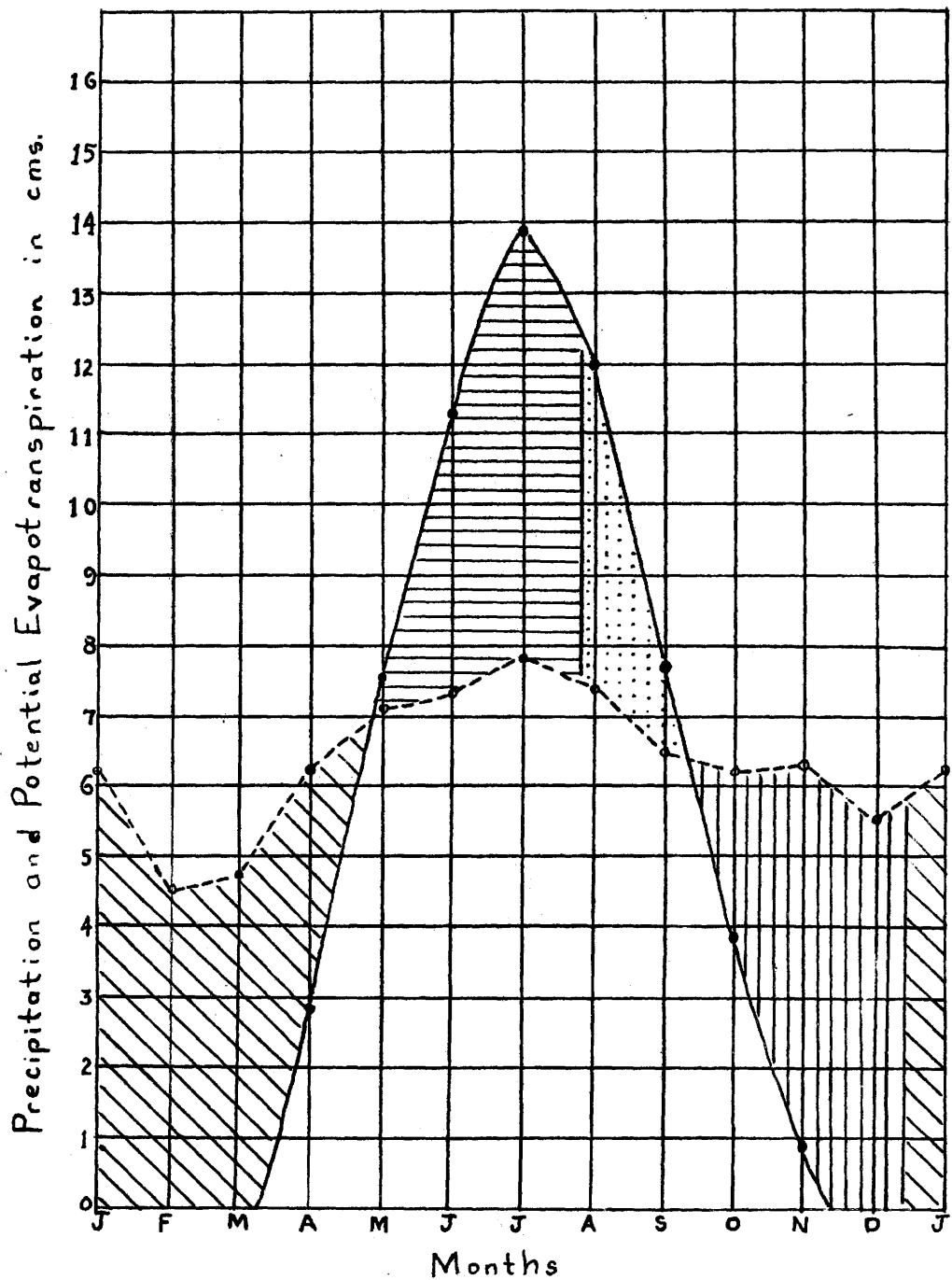
(viii) Climate:

Nassagaweya lies within a regional climate classification by W. Koeppen's known as Dfb...<sup>\*1</sup> This simply means that it is characterized by; a humid microthermal climate with sufficient precipitation each month, a mean temperature of the warmest month below 72<sup>0</sup>F., and at least four months with a mean temperature over 50<sup>0</sup>F. According to Chapman and Putnam this area belongs to the South Slope Region of the Climatic Regions of Southern Ontario.<sup>\*2</sup> This means that this area, like the northern shore of Lake Ontario, has a southern exposure and is somewhat milder than areas a bit further north. This similarity to the north shore of Lake

<sup>\*1</sup> Trewartha, G.T., An Introduction to Weather and Climate McGraw-Hill Book Co. Inc. New York 1943

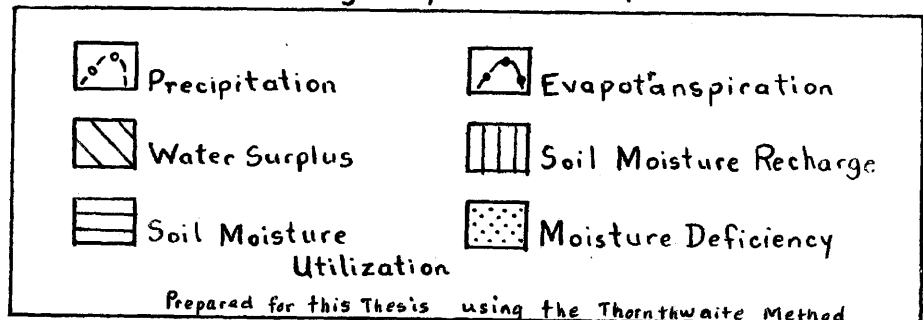
<sup>\*2</sup> Putnam, D.F. & Chapman, L.S., The Climate of Southern Ontario. Scientific Agriculture 18:8, April 1938.





### MOISTURE RELATIONSHIPS

Nassagaweya Township



Ontario shows up well in climatic data.

The length of the growing season averages 200 days from April 16 when the mean temperature rises above 42<sup>0</sup>F., to October 28 when it drops below. The average number of frost free days is 147, usually from May 18 to October 1. The average Autumn temperature is 47<sup>0</sup>F., winter 21<sup>0</sup>F., spring 41<sup>0</sup>F., and summer 66<sup>0</sup>F.

There is no weather recording station in Nassagaweya but climatic data has been used in this thesis for Guelph which is five miles west of the northern end of the township and Georgetown which is five miles east of the township, just below the escarpment. (See Appendix C).

A Thornthwaite graph,(Page 58) prepared from this information shows the precipitation and the various soil moisture relationships throughout the year. The maximum precipitation comes in the summer when it is most needed and the chart indicates that there is very little moisture deficiency. The decrease in precipitation and the soil moisture deficiency in August correspond well with the harvesting of grain. The meaning of this graph is significant only where the soils are deep, (it is invalid on the limestone plain where the soils are shallow and the summer drought pronounced), indicating that irrigation and drought resistant crops are not required. Serious droughts are very unlikely. The general farming of the township is well suited to the climate.

It was first expected that the escarpment would cause some localized variations in the climate and consequently affect the land use but this does not seem to hold true. Although the precipitation below the escarpment is about

two inches heavier, the temperature does not vary very much, except in the spring and early summer when temperatures below the escarpment run a few degrees cooler. This area is fairly well removed from the warming influence of Lake Ontario. These factors may be the reason why recently planted dwarf apple trees (orchards) are found on the escarpment, not below it. However, in general it appears that the difference in climate above the escarpment and below it are rather slight and the land use is similar. Any areal differences that occur are the result of soils and physiography.

In summary it can be said that the climate is quite satisfactory for the present land use, which is dominated by pasture, hay, oats, and forest. The physical barrier of the Niagara escarpment has very little influence on the climate. Climate does not enter in as a factor in any differentiation of the existing land use characteristics.



## HISTORICAL GEOGRAPHY

This part of the thesis deals with the historical geography of Nassagaweya so that the history of the present land use may be more clearly understood. The main sources of information were, The History of Nassagaweya by Joshua Norrish, already referred to, and the Canadian Census Reports.

## (1) History of Settlement:

The districts of Halton County and Wentworth County were purchased from the Six Nation Indians in 1812 and became known as the Gore District. After 1816 the district was opened for settlement and the more accessible areas along the Lake Ontario shore were naturally occupied first. In 1819, what was to become the Township of Nassagaweya, was surveyed in two parts. In May of that year, Ruben Sherwood, Deputy Provincial Land Surveyor, surveyed Nelson Township and the lower end of what was called the "back" township (Nassagaweya). Later that year the upper end was surveyed by Samuel Ryckman. The concessions were surveyed at right angles to Lake Ontario. This accounts for the position in which the township lies. The numerous jogs in the lot lines and roads are not apparent on the surveyors map. Everything is straight and even. It is obviously much easier to draw a straight line on paper than to run with a compass through the hills and swamps of Nassagaweya.

Never-the-less these surveyors laid the foundation for the pattern of settlement that was to follow.

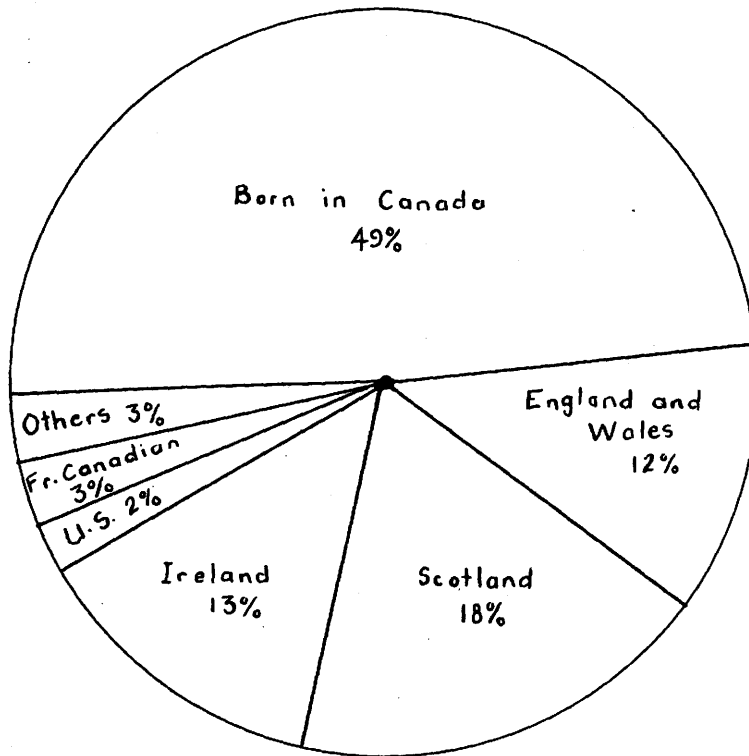
The Gore District, which was divided into Halton and Wentworth Counties in 1853, was originally set aside as an area to be settled by United Empire Loyalists and veterans of the War of 1812. Many of these people held title to the land but did not settle. They sold their holdings to new immigrants arriving from England and Scotland who had come to Canada to escape the privations that resulted from the Napoleonic Wars, and the abject misery fostered by the Industrial Revolution.

The origin of the settlers emigrated to Nassagaweya can be seen by the pie graph on page (63). Almost all of them came from Great Britain. The large percentage of Canadian born inhabitants represented in this graph are the off springs of the settlers. The information for this graph was taken in 1851, thirty years after settlement in the township began. The Scotch made up the majority of the settlers. The Irish were the next most numerous group followed closely by those from England and Wales. These three groups together made up approximately 85% of the settlers who entered Nassagaweya in the booming years of settlement before 1851.

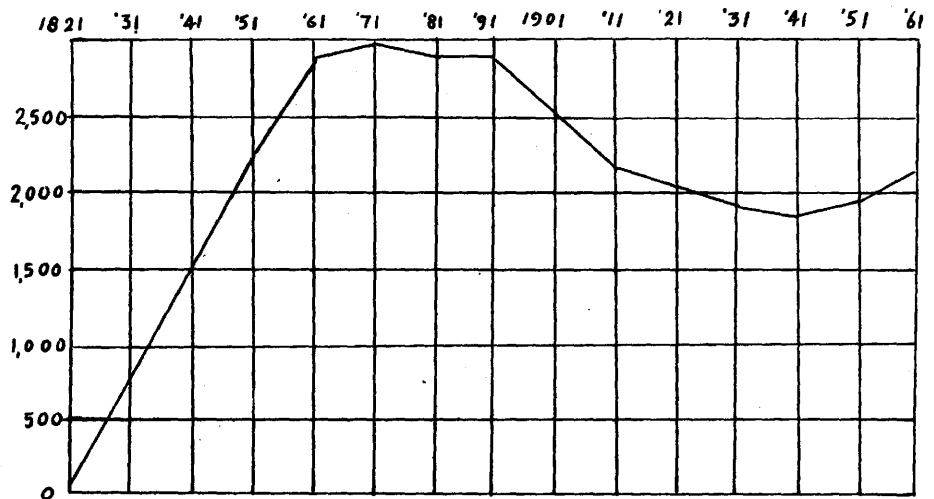
The first settler to take up land in the township and clear it was David Scott, a native of Roxburghshire, Scotland. He planted his first crop and built a house on Lot 1, Concession 7., in 1821. A close second was William Trudgen, a native of Cornwall, England who commenced farming on Lot 22, Concession 3., in 1822.

It is not my intention to delve any further into the list of early settlers. A fairly complete account can be

Population  
2237



Origin of Birth  
1851



Population Graph  
Graph



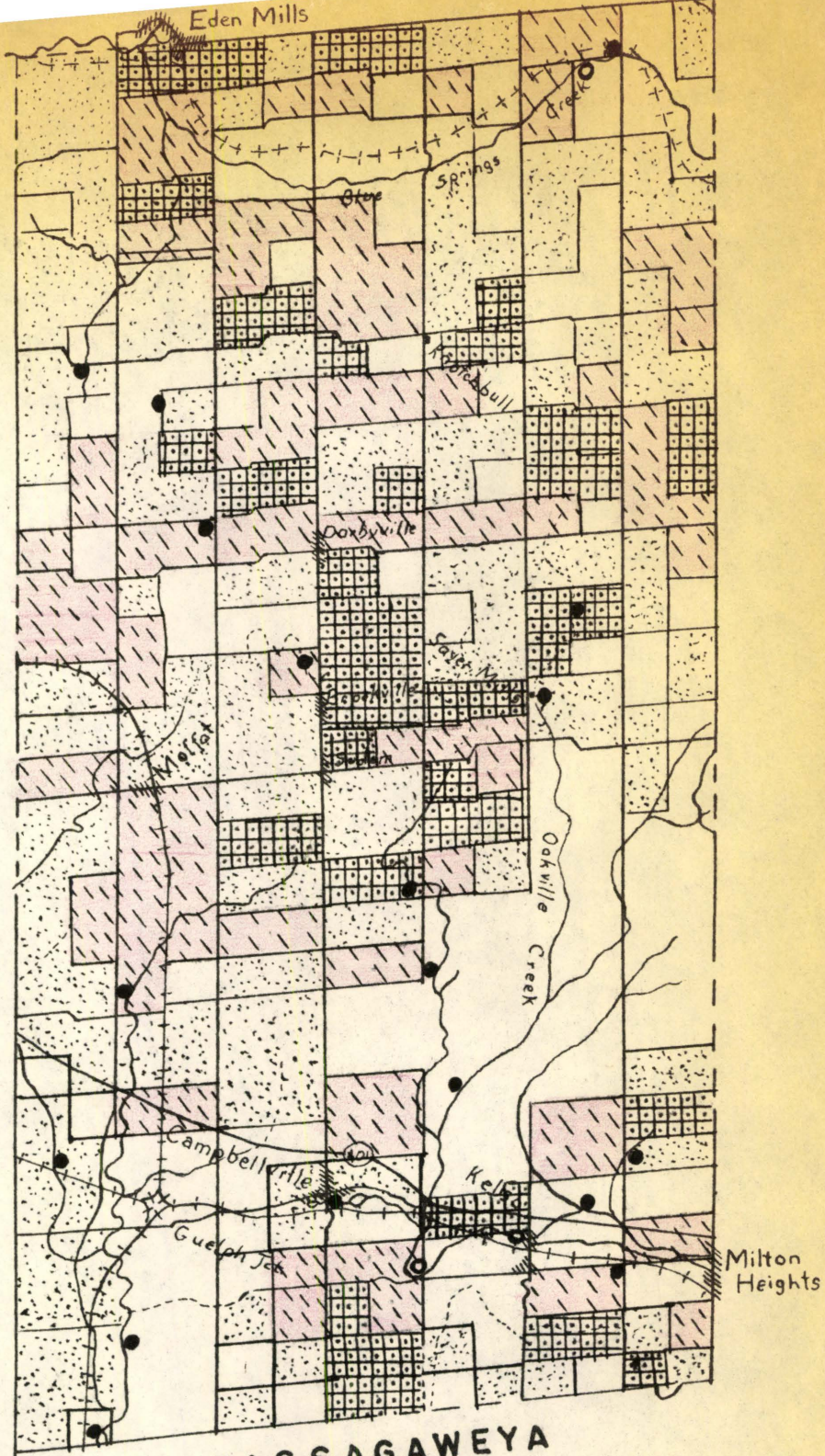
found in Joshua Norrish's book. From this book and other historical records I have prepared a map of settlement indicating the pattern in which the land was opened up.

The period from 1820 to 1829 was a period of initial occupation of the land. Notice that there are few single isolated lots. The reason for this is that some of the settlers immigrated in groups and took up land in small clans, while others located where they would have neighbours. Concentrations are noticeable in the southeastern part of the township, in the east central section, and in the northern end. There appears to be certain underlying reasons for this apart from neighbourliness.

Towards the end of the 18<sup>th</sup> century it has been reported that a cyclone passed through the township in a diagonal west-east direction from Lot 23, Concession 1., to Lot 8, Concession 7., knocking down the dense forest in its path. A fairly large part of the early settlement was located in the wake of this storm, particularly around Brookville. It seems very probable that the early settlers chose this area because a great amount of labour in clearing was saved. All the large trees were felled by the storm leaving only a fairly young forest growth to deal with.

The Guelph line is also of major importance in this settlement pattern. It was the only trail passing through the township and it should be noticed that the majority of the early holdings faced onto it.

Most of the farmsteads are in the eastern half of the township. The reason for this is that many settlers moved into Nassagaweya by routes in Esquesing Township which



**NASSAGAWEYA**  
TOWNSHIP  
SCALE: 1 in. = 1/2 mi.

SETTLEMENT	
1820 - 1829	Recent or Nil
1830 - 1839	Saw-mill
1840 - 1880	Grist-mill

Prepared for this Thesis based on Historical records



was occupied a little earlier than Nassagaweya. The settlement concentration in the northwestern part of the township was associated with the occupation of land in Eramosa Township whose core was in the Guelph area.

In the period 1830 to 1839 the settlement pattern was merely an extension of the previous decade with the same reasons applying. A great deal of this settlement took place on the moraine in the northern part of the township particularly close to the Guelph line.

The most striking feature of this period is the spread of settlement into the west central part of the township. This area was inaccessible from the west because of the Beverly Swamp.

In the period 1840 to 1880 all of the remaining agriculturally potential land was occupied and the history of settlement came to an end. The areas left unoccupied were poorly drained swamp areas and limestone plain where the overburden is very shallow. In most cases the early settlers chose the best land available so that to a certain extent the physiography has controlled the settlement pattern. For this reason a large proportion of the first twenty years of settlement is found on the gently rolling moraine and drumlin areas.

What effect, if any, has the history of settlement had on the land use of the township? In the first place, it means that most of the arable land has been under cultivation for at least one hundred years. This is obviously going to affect the fertility of the soils and the amount of soil erosion. The latter must have been very pronounced under the intense cultivation of grains during the last half of the



nineteenth century. For these reasons the last fifty years has seen an increase in pasture land and the planting of cultivated hay particularly alfalfa which is also an important soil builder.

Soil exhaustion coupled with the clearing of land that should have been left in forest are in part the reasons for abandoned and part-time farms in the township. This will be dealt with later in more detail.

The most obvious effect of the history of settlement on the land use is the clearing away of the virgin forests so that today approximately 70% of the township consists of clear land.

It should be noted that settlement followed a pre-determined plan laid down by the surveyors. For this reason the land use has a certain regularity of pattern. The development of the Guelph line trail as the main artery of the township has resulted in a focusing of activity along this route.

Some of the present day small communities are associated with the earliest areas of settlement. Darbyville and Sodom are the oldest communities in the township. Also included in this group are; Brookville, Sayer Mills, Eden Mills, Knatchbull, and Kelso. These village features of the land use will be dealt with in more detail later.

#### (ii) History of Agriculture:

Agricultural data before 1851 is very scanty. The Canadian Census Reports did not begin until 1851 so that there is no record to draw from. Before 1830 agriculture was in a very rugged pioneer state. Farms consisted of isolated

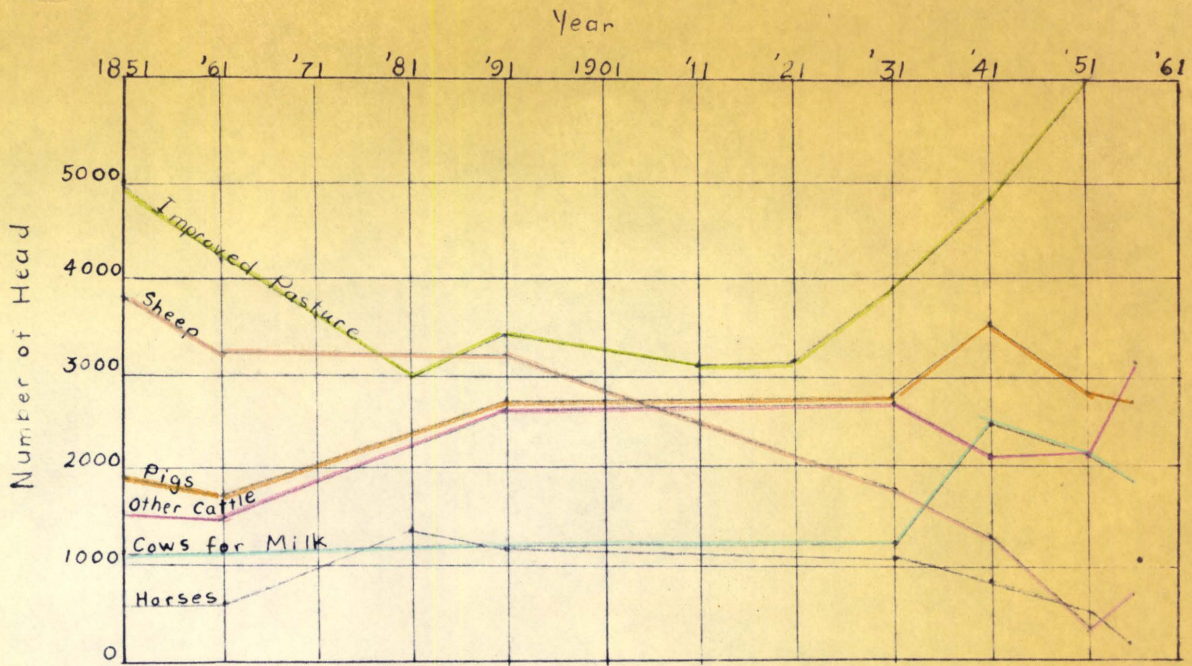
clearings in which self-sufficient farmers eked out a living. Their few milk cows, harassed by bears, foraged in the bush while they cultivated the land between the protruding stumps with a team of oxen. In this way they produced their main cash crop of wheat, while the women worked over a smoking pot producing potash from the burned-over clearing. This was their second cash crop. With the money from these crops they were able to purchase the bare essentials that they were unable to produce on the farm. Roads were scarce and in poor condition so that travel was a major undertaking.

In the decade after 1830 the population of the township tripled to 1,500. Clearings became more numerous and transportation easier. Wheat became an increasingly important cash crop taking up most of the cleared land. Improvements in transportation helped improve crop production. In 1832 the York Road was built from Toronto to Guelph, passing the northern end of the township. A road was built from Georgetown in Esquesing Township to Oakville.

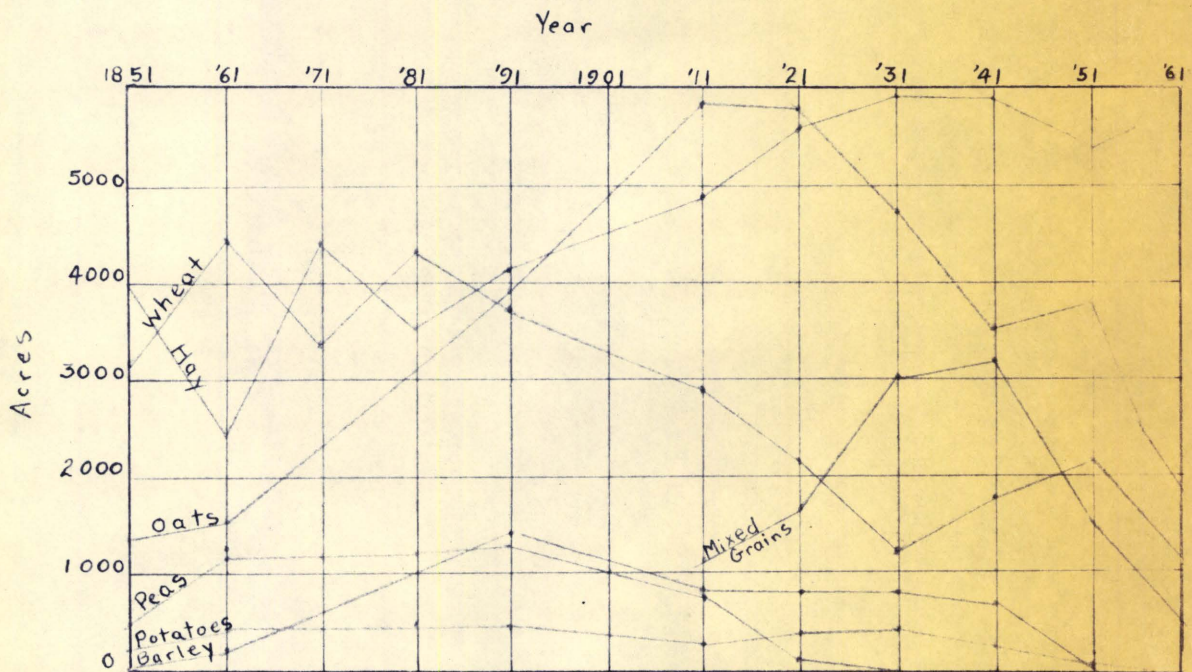
After 1840 the production of wheat continually increased, encouraged by American speculators who purchased and transported it to Lake Ontario, through the recently built Welland Canal to the Erie Canal for shipment to the Atlantic seaboard. In 1846, W.H. Smith reported that Nassagaweya Township was well watered and contained some excellent land. Some 25,121 acres had been taken up, 7,314 acres of which were under cultivation.\*1

In 1851, the first census was made and from this we can get some factual idea of what agriculture was like in the

\*1 Smith, W.H., Canadian Gazetteer, 1846.



Livestock Record



Field Crop Record

Graph



township. In 1851, as in the previous two decades, wheat was the main crop taking up over 3,000 acres and still increasing. The reasons for this are simple. Wheat, until 1880, was the main cash crop in the township. The market for this crop improved in 1854 when the Reciprocity Treaty with the United States allowed Canadian farm products into that country. Furthermore, there was still a large influx of settlers into the township until 1861, which meant that the area of cultivated land was still increasing.

Before 1851, livestock were generally poorly bred, being allowed to forage in the bushland. This resulted in the development of a wiry, half-wild beast, particularly in hogs. However, by 1851 the high value of hay and improved pasture indicate an increased interest in livestock raising.

Oats were the third most important crop in 1851. They were probably established as a main grain crop by the large number of Scottish settlers. Oats were the main staple of the Scottish diet as it was the only grain that could withstand the cool damp climate in most of Scotland. The steady rise in acreage of oats until 1911, becoming the main crop in the township after 1891, can be attributed in part to the increase in horses as draft animals, and the use of oats as a fodder crop to other livestock. The favouring of oats can be attributed to the decrease in wheat acreage and the fact that the climate of Nassagaweya is better adapted to the growth of oats. Since oats are less demanding in their soil requirements than wheat, they could indicate a decrease in soil fertility after long years of intensive wheat cultivation.

Peas and potatoes were typical subsistant pioneer

# LAND USE

1851 to 1956

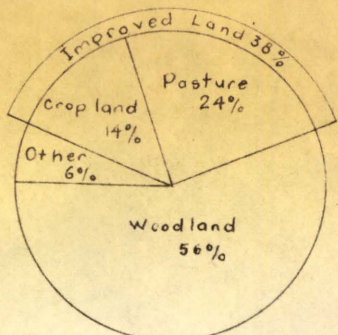


fig. 1 a

TOTAL AREA

1851

CROP LAND

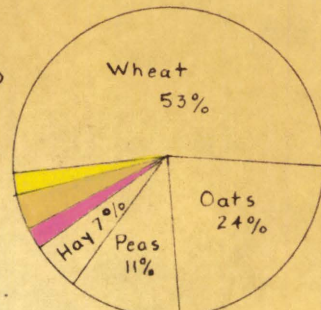


fig. 1 b

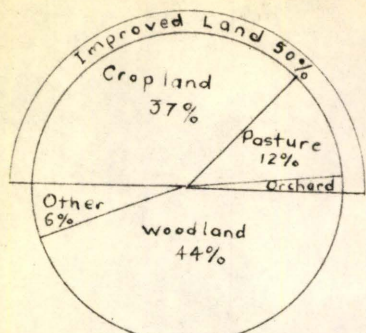


fig. 2 a

1881

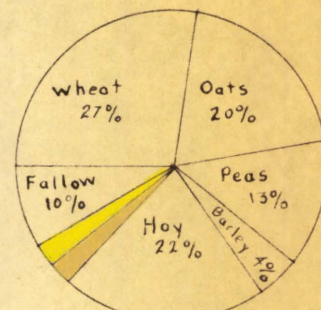


fig. 2 b

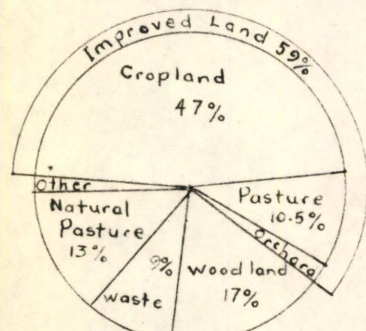


fig. 3 a

1911

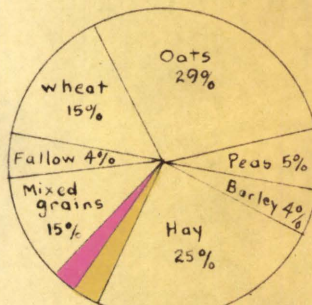


fig. 3 b

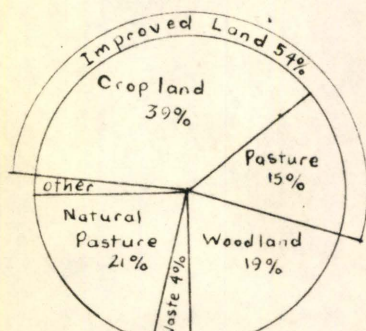


fig. 4 a

1941

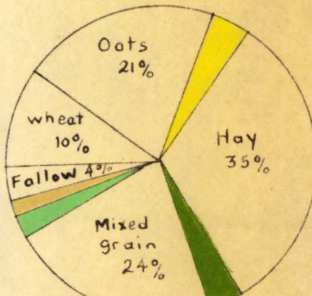


fig. 4 b

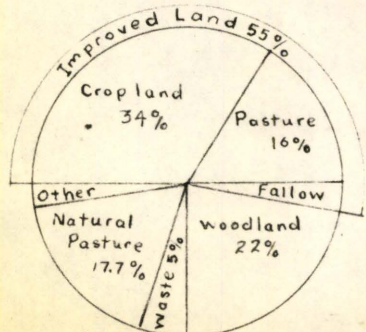


fig 5 a

1956

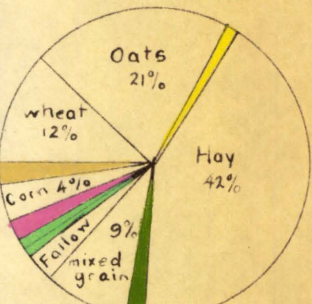
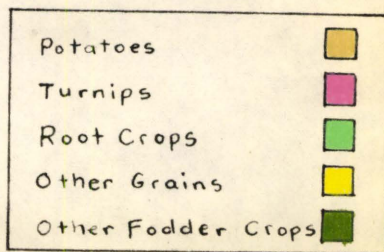


fig. 5 b

crops grown in the township. Peas were important as a crop for fattening hogs and cultivation increased until 1891 when the pea weevil cut down their production.

Summarizing, in 1851 we see that much of the pioneer rawness was vanishing, and larger areas under intense cultivation were the rule. Wheat was the main crop. Oxen were giving way to horses and there was increased attention paid to livestock.

After 1861, one of the characteristics of agriculture, as we have already seen, was the steady increase in oat production. Also characteristic of this period until 1891 was the vacillating nature of wheat production and the corresponding reciprocal movements of hay production. Wheat reached its peak of production in 1861, encouraged by reciprocity. However, the treaty was terminated soon after and wheat production fell off. Until 1860, fall wheat was the main crop, but production dropped off as a result of smut and declining yields. Moreover, after 1861, the population growth that had been booming during the previous thirty years, became stabilized. After 1870, spring wheat became relatively more important and wheat production increased until 1880 when the competition produced by the opening of the West was felt. Western hard wheat became the world standard for quality and after 1891, wheat production in the township began a steady and ultimately drastic decline.

Hay production for this period 1861 to 1891 was closely associated as a reciprocal crop with wheat. The graph showing field crop production indicates that when wheat production dropped, hay production increased and with



the steady decline of wheat after 1891, hay had a reciprocal steady increase. The significance of this will be seen later.

Another feature of this period 1861 to 1891 that should not go unnoticed is the increase in barley production. This increase has a rather unusual cause. There was, during this time, a severe tax on Whiskey in the United States. As a result beer, a cheaper beverage made from barley, became increasingly popular. Thus there was growing demand on the American market for barley.

The agricultural history of the township after 1891 is characterized by a number of significant changes that indicate a turning point in the land use. As we have already seen, wheat production declined drastically while the production of oats and hay increased steadily to an all time high after 1911 and 1931 respectively. In 1891, hay and cattle production had reached an unprecedented height. Unfortunately no census statistics are available for the period 1901 to 1921 so it is impossible to see just what the effect of cattle and hay production was after 1891. Also after 1891, the number of sheep, which had remained fairly constant during the previous thirty years, began a serious and continued drop. This is probably a result of a decline in local woollen milling and the ravaging of the flocks by dogs. In 1905, McCann's woollen mill at Campbellville closed down. It was the only woollen mill in the township. Barley production declined in the face of increasing United States tariffs after 1891.

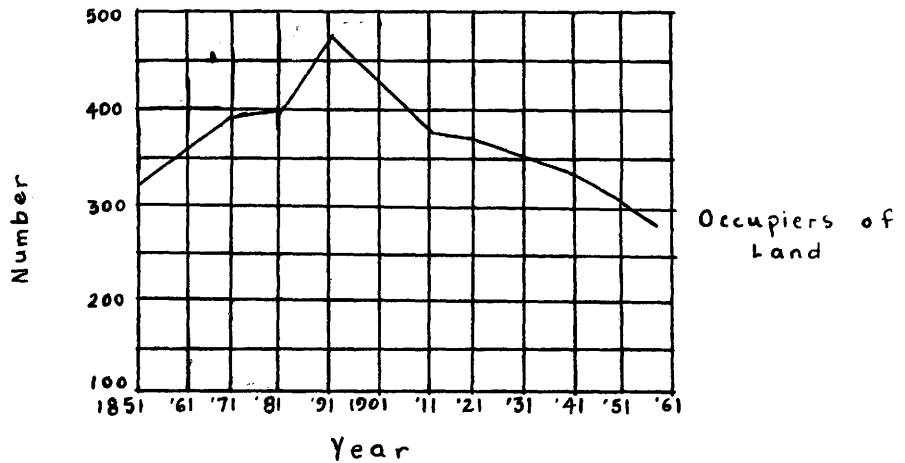
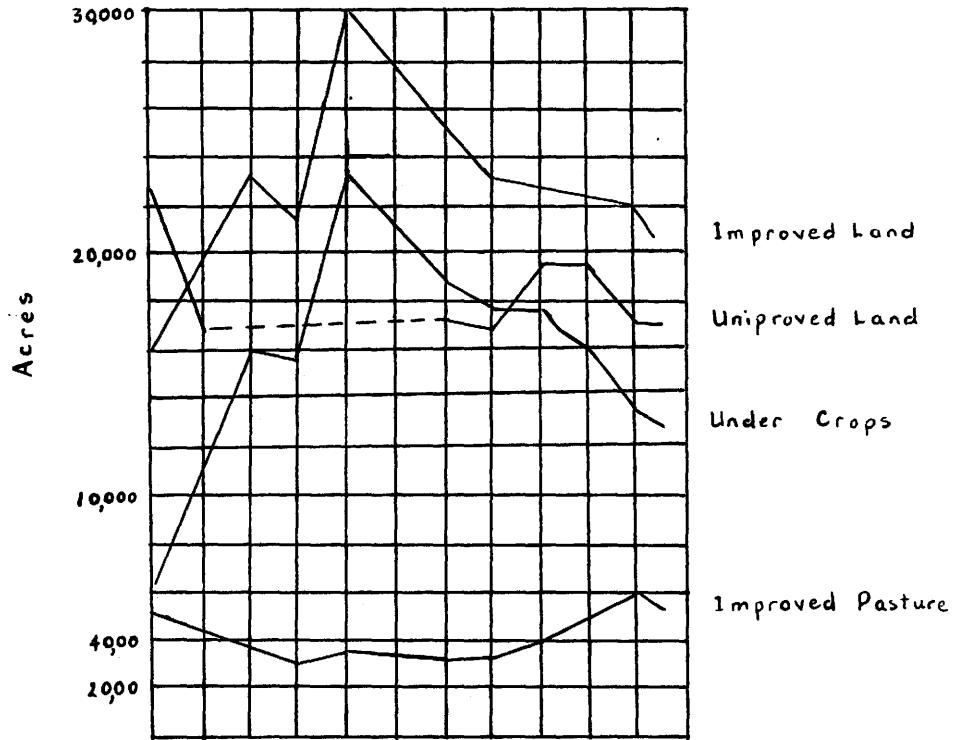
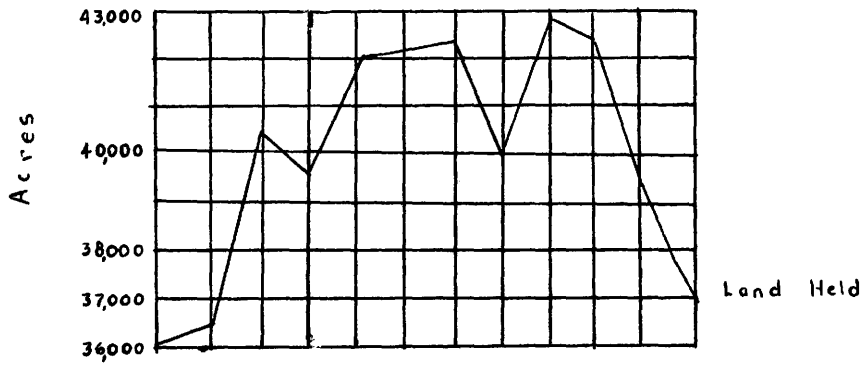
With the capturing of the wheat market by western Canada, Ontario farmers were forced to use their generally

more valuable land for higher value crops and animal husbandry. Thus the farmers of Nassagaweya Township turned to mixed or general farming. This was not an arbitrary choice by the farmer because he was guided by a new, growing, market demand. This was a period of rapid city growth, with an increasing demand for dairy products. This new market was encouraged by the advent of pasteurization and the introduction of modern milk distribution resulting from better communication.

1891 was also significant as the beginning of a long population decline. This corresponded to a sharp drop in the area of improved and cultivated land. The number of farm holders fell sharply also.

The reasons for this population decline are varied. Many joined the westward migration, captured by the advertisements of the railway companies and the prairie land companies. Others were attracted to the rapidly growing cities with their industries. Inefficient farm practices, loss in soil fertility and soil erosion resulted in inadequate financial returns and many farmers were unable to meet the mortgage payments. For those who could afford it, technological improvements and mechanization made agriculture more efficient but also reduced the amount of farm labour required. The decline in farm population was augmented by the decline of small urban centres. This will be discussed later.

It has been suggested that the decline of wheat, barley and sheep are associated with the population decline. However, if this line of argument is used, then the increase of hay, oats and livestock during the same period must be



Graph



associated with an increase in population. This of course is not true and therefore this line of reasoning is not valid.

There was no census material of value available for 1901. The 1911 census indicated that there was a continued increase in the production of hay and oats. Since there was no data for cattle, it is difficult to say just what the relationship was. However, there was no increase in acreage of improved pasture so it can be assumed that there was no unusual rise in livestock production. It would appear more logical to say that Nassagaweya sold her oat and hay production to farms closer to the cities that were producing dairy products.

The characteristic feature of the land use after 1921 was the beginning of a long and steady decline in oat production. This was probably not as important as it appears because of the rapid increase of mixed grains which are a mixture of oats and barley. This may simply mean that oat acreage was being planted with a mixture of oats and barley. Moreover there was a sharp and rapid increase of improved pasture land after 1921 indicating that some oat acreage may have been turned to pasture.

Another feature of this decade was the levelling of the population decline and an increase in the area of land held.

In 1931 there again appears to be an important change in the farm economy of Nassagaweya. The number of milk cows and hogs increased rapidly, while other cattle decreased. This is probably the result of the expansion of cities

during the latter part of that decade, and the improved sanitation standards with increased emphasis on the nutritional value of milk. The increase in hogs was in part the result of a trade pact made with Great Britain in 1932 for the export of pork. Also associated with this period is the sharp decrease in acreage under crops and the continuous increase of improved pasture.

An increase in wheat production in the township after a long decline occurred in the two decades after 1931. This was probably associated with the failure of prairie grain crops because of severe drought during the thirties. The increase in wheat following 1940 was probably a result of the war-time economy and the post war boom.

The last significant point about 1931 is that it marked the beginning of the end for the horse as a draught animal. Mechanization was rather slow in coming to Nassagaweya because it is not a rich township.

If 1891, after 60 years of occupation, was a turning point in the economy of Nassagaweya, then the last 60 years may have reached a turning point in 1951. In the first place it marks the first general decline of all grain crops. This corresponds with a decline in acreage under crops, and a decline in the acreage of land holding. In spite of this, 1951 marks the first real population increase in ninety years. Most of this increase is in non farm population. This decade also marks the first increase in sheep kept since the collection of census material. Cattle, excluding milk cows, have substantially increased during this decade. The significance of this and other features will be discussed with the present

land use in a later chapter.

This then is the history of the agricultural land use of Nassagaweya Township. It is a history that has seen a rapid influx of settlers who indiscriminately cleared the virgin land to cultivate soil-depleting crops of wheat intensively. With the loss of wheat markets and the growth of cities, agriculture became more generalized with an emphasis on livestock. This, along with cultivation of oats and hay was well suited to the climate and physical nature of the township. After the initial boom there was a gradual deflation of the farm economy and population. Farmers were drawn to the Canadian west and to industry. The twentieth century initiated modern times which were characterized by large expanding cities and towns with better systems of communication as well as improved methods and techniques. Not until 1931 did the expanding dairy industry affect Nassagaweya. In recent years the population has begun to grow with the spread of urban influence into the township. Grain production has reached its lowest ebb in eighty years as the acreage of cultivated land continues to decrease and hay increases. Finally, livestock production is at a general high level, with dairy cattle being important and other cattle along with hogs, even more important.

What has been the effect of historical agriculture on the land use of the township? All grains are grown as fodder crops because of the increased importance of livestock. This also necessitates an increasing acreage of pasture and hay crops. The predominance of oats in the past, their value as a feed grain, and the suitability of



the climate means that oats are still the main crop. Although wheat has declined greatly, it is still an important grain crop. Peas, potatoes, and barley have all but vanished. The inherently poor land and loss of fertility have caused the amount of land held for farming to decrease. This has created a large amount of idle and abandoned land.

### (iii) History of Urban Development:

Before beginning this section it should be explained that the township does not contain any large towns or cities and in this thesis the term "urban" is used in reference to village or hamlet characteristics, while the term "suburban" refers to strip housing developments which show a communal aspect but do not have any village or hamlet functions.

The urban geography of Nassagaweya Township is closely related to the history of settlement and the transportation grid, although it should be noted that mill sites were involved in the case of Campbellville and Sayer Mills. All the communities, with the exception of Guelph Junction and Milton Heights, predate the coming of the railway. When it did come certain towns benefited from it at the expense of others. Their growth stands out not because it was substantial but because we are dealing with such small scale communities. However, there is a definite distinction between railway communities and non-railway communities and they will be presented in this way. But first it is necessary to see how the transportation system evolved.

Roadways were the important locating factor for the early communities. The Guelph line was the first trail

passing through the township so naturally it became the first road. It was called the stage line and followed the same route as today, running from Nelson village on Number Five Highway to Guelph. Today it is the main road of the township. The second road built was Number Five side road running through the lower end of the township to Milton, the county seat. These two roads are now the only two paved roads in the township. The York Road passing through the northern end corner of the township played a part in the development of that part of the township. A trail running from Sodom to Speyside in Esquesing Township was probably developed early as a road. A discussion of the road pattern of the township at present will be given in the next chapter.

A second phase of urban development came with the building of railways. This gave a great impetus to communities situated on the right of way. In 1878 the Credit Valley Railroad Company built a line from Toronto to Milton and Campbellville. In 1880 this was taken over by the Canadian Pacific Railway Company and in 1888, a line was built from Guelph Junction to Guelph. Guelph Junction rather than Campbellville, was chosen as the best site for the extension of the line to Guelph because it offers an open route to the north and has plenty of level land for sidings and switches. Campbellville is confined in a narrow valley. In 1911 another line was built from Guelph Junction to Hamilton. Also about this time an electric railway was built from Brampton to Guelph. It followed the Acton Spillway and passed by Eden Mills, but it was abandoned by 1930.

Most of the communities in Nassagaweya Township had

their origin in the middle of the nineteenth century when the population was at a par with that of today. A number of these communities were located in areas of earliest settlement where the well established citizens were able to branch out into commercial endeavours as the population influx increased to a prosperous maximum after 1851. Some of these communities were hard hit by the population decline after 1890. Their economic decline was further hastened by the growth of those towns that were closely associated with the building of railways. The following are those centres that were not connected with the building of railways..

Darbyville: This hamlet was named after Edward Darby who opened a wagon-makers shop and blacksmiths shop at the intersection of Number Twenty side road and the Guelph line in 1838. A store was built here in 1848. This was followed by a few houses and a paint shop. After 1890 the hamlet declined and in 1929 the last of the businesses, the wagon and carriage shop, closed.

Sodom: This hamlet was built at the intersection of Number 15 side road and the Guelph line. It was first known as Haltonville but has acquired the name of Sodom which is found on most maps. In 1845 George Black built a house here, then a shoemaker's shop. A general store and a blacksmith shop were opened in 1846 followed by a hotel in 1850. In 1852 the township's first doctor set up his office here. In 1855 a tea shop was opened, in 1863 a second blacksmith shop and in 1878 Meade's apiary and a carpenter shop. Nassagaweya Presbyterian Church was built here in 1861. By 1888 Sodom began to feel the effects of a declining economy.



Joshua Norrish writes, "the village is pretty flat, the only business carried on is King's carpenter shop, Meade's apiary, and a tea store". In 1898 a rifle range and a Drill shed were built at Sodom. Also in 1898 a creamery and chopping mill were opened. This was indicative of the trend to increased emphasis on cattle after 1890. However, by 1920 Sodom was reduced to a creamery and a general store.

Sodom is well located. It lies in the heart of the township on a fairly important intersection in the productive drumlin area. If the railway had come to Sodom instead of Campbellville it would probably be the main community today.

Brookville: Thomas Easterbrook, one of the earliest settlers in the township, built a store, hotel and shed on this site in 1852. In 1854 the Agricultural Society held their exhibition here and for some time after. It was the centre of the oldest and most influential settlers. For this reason the township hall was built here in 1875. A tailor shop and a harness shop were built in the same year. A dentist, a doctor and a veterinarian were established here before 1900. In that year a fire destroyed most of the hamlet.

Brookville, is located about a mile north of Sodom, but does not enjoy as natural a site as Sodom. There is no cross road. The fire of 1900 all but destroyed the hamlet but it has persisted because the township hall was built there, and it escaped damage in the fire.

Knatchbull: In 1860 William Stephensen and John Edwards started a blacksmith and wagon business here. It soon developed into a small industry producing plows, em-

ploying eight men and a steam engine. A general store and a post office were built but when the industry failed, the community disappeared. All the buildings were removed years ago and Knatchbull became nothing more than a name on the map.

Sayer Mills: This was little more than a farm community clustered around a saw mill built by Sayer in 1860. It is rather a poor farming area, being submarginal to the limestone plain and abandoned land has attracted low cost housing in recent years.

These then, are the communities of Nassagaweya that can all be grouped together as having suffered a decline or in some cases disappearance. They all have two common characteristics. They are located in the earliest settled parts of the township and they were by-passed by the railway.

In explaining the reasons for the decline of these centres, it is not enough to say the railway was the cause. True enough, the railway did give certain economic advantages to some villages which were able to grow larger and control the commercial functions of smaller rural centres, but this alone was not enough. There was a general improvement in transportation facilities during this period which enabled people to go further and to go places that offered better services. The railway towns were able to develop industry to supplement their commercial activities. The straw that broke the camel's back was the introduction of the rural route postal delivery. This removed the last important function of the rural community.

The remainder of the towns to be discussed are



Fig. 27. Sayer's Mill built in 1860 was one of many mills in the township. A small farm community was established around this mill.



Fig. 28. Lime kilns between Concessions 6 & 7 were opened in 1881 when the building of the railway made the mining of the limestone and shipping of lime and stone economical.



located on the railway. They have not undergone any serious decline, and in some cases expanded. Since Nassagaweya does not have any really large towns, the coming of the railway has had a somewhat less pronounced effect upon urban development than is usual. These communities all have one feature in common. They have developed economic activities which are directly associated with the railways and are of major importance to themselves and the whole township.

Kelso and Christie: These communities were once located on the main road to Milton, but they were by-passed when the more direct route of Number Five side road was built. The community of Kelso is located on the West Branch of the Oakville Creek and Christie is located at an intersection less than one quarter of a mile distant at the foot of the Niagara escarpment. A store was opened at the intersection in 1848 and four years later Flewis' grist mill was built on the Oakville Creek at Kelso. In 1878 when the railway was built, it passed between Kelso and Christie. With the railway passing the foot of the escarpment, the limestone became very economic to mine and transport. In 1881, Dr. Robertson of Milton operated two lime kilns at the escarpment between the sixth and seventh Concessions. Also in that year, D. Christie built three lime kilns near the intersection and gave his name to the community that developed. The lime was sent to Toronto, and quarried limestone was used for building purposes locally. The kilns at Christie closed down about 1910. No other industries were attracted to this site so Kelso and Christie became sleepy settlements until recent years when suburban elements have been attracted to the site.

The only thing that prevented Kelso and Christie from disappearing like Darbyville and Knatchbull, was the railway which facilitated the lime industry. They declined when the lime kilns closed but the homes are still in fairly good condition and it is close to employment in Milton. They are no longer located on a main routeway and are not in a prosperous farm area.

Milton Heights: This community straddles the boundary between Nassagaweya and Esquesing. The reason for its existence is found in the clay pits at the foot of the Niagara escarpment in the former township. Like the limestone, this clay did not become economically important until the coming of the railway. In 1888, a brick works, the Toronto Pressed Brick and Terra Cotta Company was established. This was followed by a second. These two plants later became known as the Inter-Provincial Brick Company and the Milton Brick Company. Above the clay pits the Gypsum Lime and Alabastine Company of Canada operated two lime kilns. The products of these two industries were shipped by rail mostly to Toronto. Milton Heights is a suburb of Milton and has developed as a community of workers in the above industries.

Guelph Junction: This community of railroad workers has sprung up around the main junction of the C. P. R. tracks. a complete discussion of it will be left for the chapter on present land use.

Moffat: In 1843 Charles King built a general store and a meeting house at the intersection of Number 15 side road and the road between the first and second concessions. This was followed in 1854 by a blacksmith shop and a second

store in 1857. In 1860 a shoe maker business and a wagon maker shop opened, then a post office in 1872. A Methodist Church was established in 1877. Moffat was very similar to Sodom. They were both industrious little villages but in 1888 the C.F.R. was extended to Guelph and passed through Moffat. At this time Joshua Norrish described Sodom as "pretty flat", while at Moffat, a station with a telegraph was built. Stockyards and weigh scales enabled the farmers to ship livestock, in addition to lumber and cordwood. A saw mill was established in the town in 1908, as well as a Massey Harris Agency. Canada Grain Company erected a large grain elevator in 1912 and another grocery store was opened. With the coming of the automobile the village blacksmith shop was replaced by Moffat Motors.

The significance of the railway is readily seen in the growth of Moffat after 1888. Not only was there expansion but the heart of the community gravitated away from the original intersection site to the railway, creating two villages split by a marsh and open fields.

Campbellville: Campbellville is the largest village in the township. Its history dates back to 1832 when John Campbell first settled in the place. The town site became established when he built a combination dam and bridge across the creek at the Guelph line in 1837. The following year he built a saw mill to utilize this water power. In 1842 Davidson's blacksmith shop opened. In 1848 a tavern and a tannery opened, followed by a store and a post office. A steam saw mill was built in 1852 and did a large business until 1875 when pine tree resources began to fail. Robert Meade opened a shoe shop in 1854. In 1847, a Mr. McCann



established one of the first industries in the township when he built a woollen factory at Campbellville.

In 1880 the railroad came to Campbellville. In response to this the Terra Cotta Company built a brick works in the town along the railway with the intention of hauling the clay four miles by road from Nelson Township to Campbellville. This proved to be too costly an operation and the plant closed down in 1893. The property was acquired by Murray Crawford in 1900 and converted it to a saw mill and retail fuel business. In 1905 McCann's woollen mill was converted into a cement and concrete tile plant using local lime resources. Charles King purchased the old mill in 1927 and formed the King Calcium Products Limited producing bug killer. The Metropolitan Bank opened a sub-branch here in 1909 and it was absorbed by the Bank of Nova Scotia in 1915. When the hotel burned down in 1929 it was not replaced and a garage and service station opened on the site. In 1914 Campbellville was incorporated as a Police Village and concrete sidewalks were put in. In 1924 street lights were installed.

Campbellville is very well located in the township. It was established on a natural town site where the Guelph Line bridges a tributary of the Oakville Creek providing a source of water power for mill operations. The town is also located on the main intersection in the township where Number Five side road crosses the Guelph Line. It is at the head of the funnel shaped Milton Heights re-entrant so that the railway had to pass through the town.

Campbellville is the only village in the township whose site gave it any hope of growing into a town. But it

was unable to compete with the growing towns nearby. Milton with a population of approximately 5,000 is located one mile from the eastern corner of the township or five miles from Campbellville. Georgetown also with a population of approximately 5,000 is six miles to the northeast, and Acton, approximately 3,000 people, is one mile from the northern corner. The city of Guelph with a population of 37,000 is three miles from the western corner of the township.

Thus, Nassagaweya is almost completely surrounded by large urban centres within a very short distance. Therefore there has been no need or opportunity for urban growth in the township. However, the proximity of these large urban centres at present is causing a belated upswing in the suburban population. This will be discussed further in the next chapter.

All the villages of Nassagaweya Township sprang up in the middle of the Nineteenth Century in response to a rapidly rising population. The establishment of these communities was related to cores of settlement, and the road system. With the decline of population at the turn of the century, community life declined or disappeared except for those villages which gained the economic advantages that came with the railway.

What has been the effect of urban development in the past upon the land use of Nassagaweya? The most striking effect has been the lack of urban development. This is typical of the backwoods character of the township. Its productivity and population have always been far below that of its neighbours. The township is surrounded by and tributary to a number of large towns.

## PRESENT LAND USE

The preceding chapters have been designed to introduce the reader to Nassagaweya Township and to acquaint him with the historical factors, both physical and human, that underlie the present land use of the area. However, before attaining this goal, it is necessary to understand the present day factors which are involved and control this use of the land.

(1) Factors Involved:

As we have already seen, agricultural activities compose the largest part of the land use. These activities are directed towards the raising of livestock, in particular, hogs and cattle. Although dairying is important, the emphasis on it, which was assumed at the outset of this thesis, is in fact not true. Nassagaweya, according to D. Putnam is in the Western Ontario Dairy Region which consists of mixed farming with an emphasis on dairying. However, according to the census reports, hogs and cattle have always outnumbered milk cows. Therefore it seems that the area belongs more appropriately to the General Farming Belt which consists of mixed farming with an emphasis on hogs and cattle. This belt covers most western and northwestern Southern Ontario, and according to the map showing Agricultural Regions of Southern Ontario, it passes along the northern boundary of Nassagaweya. <sup>\*1</sup> In the light of this fact and since dairying is of some importance in the township it might be better

\*1 Putnam, D., Canadian Regions, J.M. Dent & Sons, Toronto 1957, P. 241.



to consider Nassagaweya as transitional between the two regions, particularly so, since dual purpose Shorthorn cattle are very important.

At present, cattle, not including milk cows, are the most numerous livestock kept in the township. The 1956 census gives their number as 3,196 head, of which approximately 1,000 are beef cattle. There are six pure bred Shorthorn herds in the township. These are kept mostly for breeding stock and show. The recent increase in beef cattle is attributed to hobby and part-time farmers who are moving into the township. Beef cattle require a minimum of care and are ideal for this kind of farming. Dr. Best is an example of this nouveau hobby farmer. He recently purchased a one hundred acre farm (Lot 13, Con. 1.) and turned it into pasture for thirty Angus cattle. There are 88 registered beef and non-commercial cattle owners in the township. The largest part of these herds are associated with the beef-hog mixed farming economy. The majority of farmers visited during this survey kept about twenty head of beef cattle mostly Shorthorn, Durham and Hereford, along with pigs. With a total of 1,000 beef cattle and 88 herds, this means that the average per farm is eleven head. This is somewhat below the figure just mentioned. The reason for this is that there are a number of small non-commercial herds kept on a self-sufficient basis by part-time farmers who draw their main income from hogs. Moreover, a great many Shorthorn are listed under other cattle because of their dual purpose, producing both cream and beef. The market for beef is in Toronto, while the cream is sent to Milton, Acton, or Guelph.

Hogs were more important than cattle until 1956 when their number was surpassed by beef, non-commercial and dual purpose cattle. Hogs, on most of the farms visited, were considered to be the most economical farm product. On many, they were kept as the first product and beef cattle the second. One 200 acre farm had facilities for three hundred and fifty hogs, while another had one hundred. These were exceptional numbers and were considered to be specialized in hog production. The average mixed farm was found to keep from thirty to forty pigs. The predominance of hogs was easily identified by large corn cribs and a very substantial acreage of husking corn. Many of the smaller mixed farms, and part-time farmers, kept three or four pigs for breeding and sold the piglets to larger farms or to fattening pens in Galt or Ancaster. The main market for hogs is either in Ancaster or Kitchener where they are taken by truck for slaughter.

It was found during this survey that the term "dairy farm" is often used in a very general way and has caused some difficulty in interpreting statistics. The problem is caused by the fact that many dual purpose cattle producing cream are classified as dairy cattle. There are 44 cream producers in the township and the majority of these keep Shorthorn or Durham cattle.

For this thesis, dairy farms will be considered as farms producing fluid milk either for bottling or for condensing and powdering processes, because these are the farms which keep large producing dairy herds such as Holsteins, Jerseys, Guernseys, and Ayrshires. Holsteins are by far

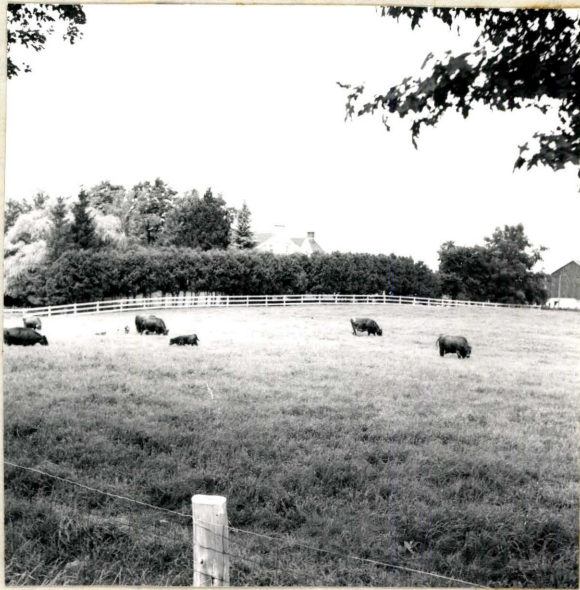


Fig. 29.

Beef cattle have been increasing in recent years. Here is a part of the pure bred stock on the farm of G. Campbell, one of the township's first Short-horn cattle breeders.

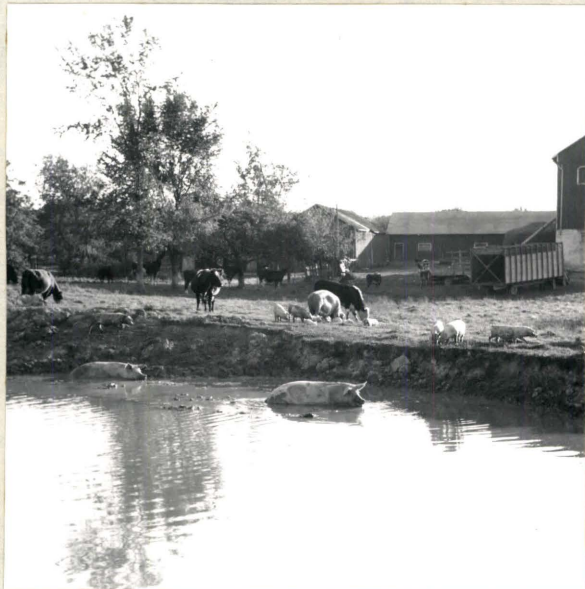


Fig. 30.

A mixture of pigs, Shorthorn, Holstein and Hereford cattle illustrates the character of the mixed farming economy that dominates the land use of Nassagaweya Township.

the most numerous dairy cattle in the township followed by Jerseys, then Guernseys and Ayrshire. The black and white spotted Holstein is popular among farmers producing fluid milk on a large scale because it produces a greater quantity of milk than any other type of cattle. The pleasant fawn-coloured Jersey and the brown and white patched Guernsey are known for the production of milk with a high butterfat content. The brown and white Ayrshire, produces a good yield of milk on poor pasture. It is especially useful for cheese-making but it is not very common in Nassagaweya.

There are 55 fluid milk shippers in the township and 1,881 milk cows as of 1956. Twenty two of these farms ship large quantities of bulk milk to fresh milk distributors. The remaining thirty three ship either bulk or gallon cans of milk to condensed or powdered milk plants. The fresh fluid milk shipments are all in bulk to Toronto. The condensed milk shipments go to Guelph.

The fluid milk shippers interviewed, had between twenty-five and thirty-five Holstein cows. One farmer had twenty-five cows and shipped 1,400 gallons of milk every two days. He held a milk contract with Acme Farmers Dairy in Toronto. The requirements for these fluid milk producers are; 1. they must have a milk contract, 2. they must have a milking machine and a bulk cooler, 3. their farm must be highly mechanized and efficient.

The thirty-three shippers of condensed milk-supplies are in a varied group. About half of them work on a large scale bulk shipment similar to the fresh milk suppliers. The remainder are mixed farmers with half a dozen or so





Fig. 31.

Dairy production in the township varies between large efficient specialized dairy farms with large herds, and small mixed agriculture farms with only a few cattle (below).



Fig. 32.

A small farm with five dairy cattle run by a part-time farmer, shipd milk to a cheese factory in Guelph.

Holsteins, shipping in gallon containers. This milk is sent to a reduction plant in Guelph.

There are also a number of small farms producing milk for butter and cheese. One farmer interviewed, owned a fifty acre farm. He was a railway employee, but kept three cows, one hog, and five dairy cattle. He shipped canned milk to a cheese factory in Guelph.

In recent years there has been an increase in sheep in the township. In 1956 the census indicated their number to be 754. From field work observation there appeared to be six farms which specialized in sheep. Five were located on the rough stony land of the moraine. This area is used for sheep pasture, because it is not suitable for much else. The present flocks are a medium wool breed. There is plenty of room for the expansion of sheep in the township but the financial return on sheep is not high and they require special care. Strong fences have to be built to protect them from dogs.

Poultry is a relatively important feature of the mixed farming economy in Nassagaweya. Most of the farms keep chickens. In 1956 there were 13,712 hens and 48,213 other kinds, of which broilers made up a very large percent. In the last decade broilers have increased very greatly with the introduction of frozen dinners and barbecued chicken in the supermarkets. On one farm that was visited during this survey, there were 2,000 hens and 6,000 broilers. The broilers were sent to Kitchener under contract to the Tenderflesh killing plant, while the eggs were sold on an egg route in Guelph or sent to a grade



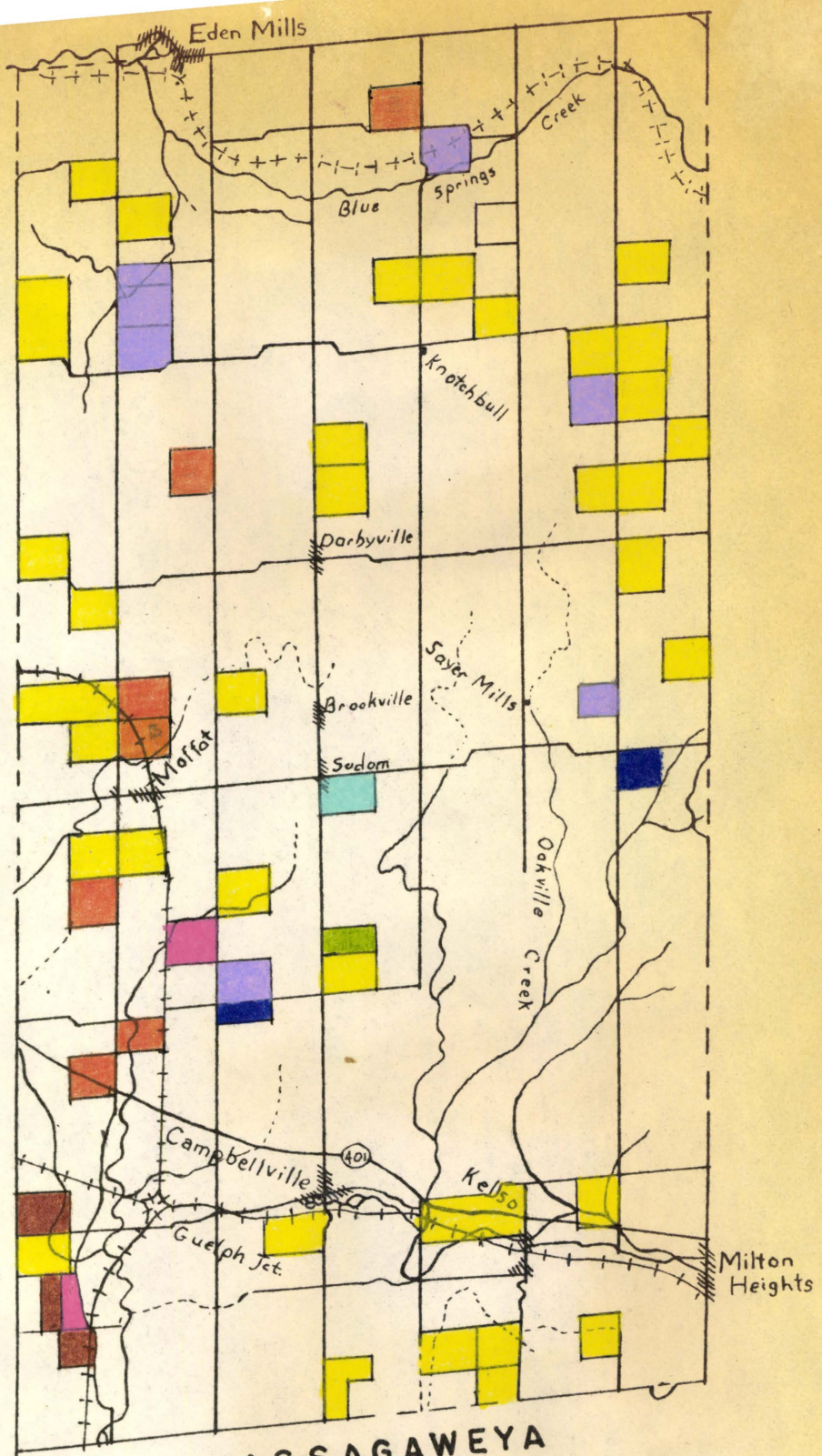


Fig. 33. Sheep are increasing in importance and are well suited to the hilly pasture land on the moraine.



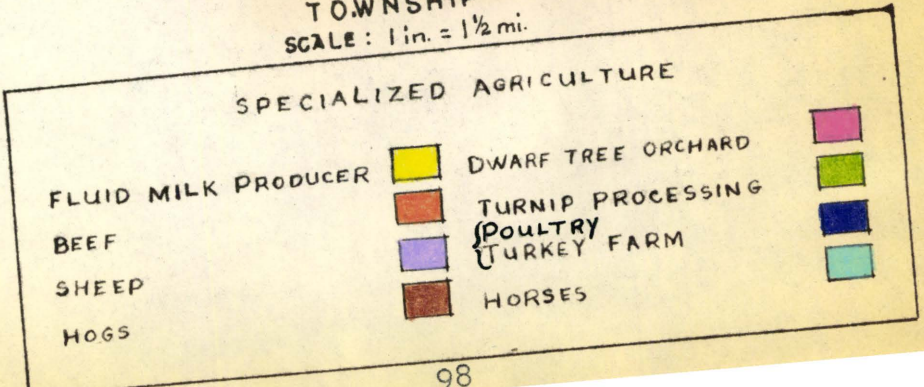
Fig. 34. Poultry are part of the mixed farming economy of Massagaweya but some farmers go in for specialization as this photograph illustrates.





**NASSAGAWEYA  
TOWNSHIP**

SCALE: 1 in. = 1 1/2 mi.





station in Lowville. Two farms specializing in poultry and one in turkeys were found in the township. These two highly specialized industries are in direct response to the large urban markets nearby and modern marketing methods.

The number of horses have been reduced by half from 1951 to 1956. There were, as of 1956, two hundred and fifty horses in the township. Their decrease as draught animals has been steady during the last three decades as a result of steady mechanization. (For a total of 280 farms there were 248 tractors). Horses are kept for a very different reason by W. Von Richthofen. He breeds and trains thoroughbred trotting horses near Sodom.

The specialized agriculture map prepared for this thesis was compiled from field work observations and interviews. It is designed to show the location and number of farmers who are engaged entirely or almost so in one type of agriculture. The rest of the township can be considered as consisting of farms occupied in general farming. Out of approximately 280 farms there are 61 engaged in special activities and 219 general farmers.

The fluid milk producers indicated on the map are all the farms with a large dairy herd which ship milk in bulk quantities. There are thirty-six of these, twenty-two of which ship to fresh milk distributors. They are found wherever the soil and physical conditions are conducive to good agricultural productivity and are associated with intensively cultivated land and improved pasture.

The beef farms indicated on this map consist of six Shorthorn herds and one Angus herd. Two of these herds are

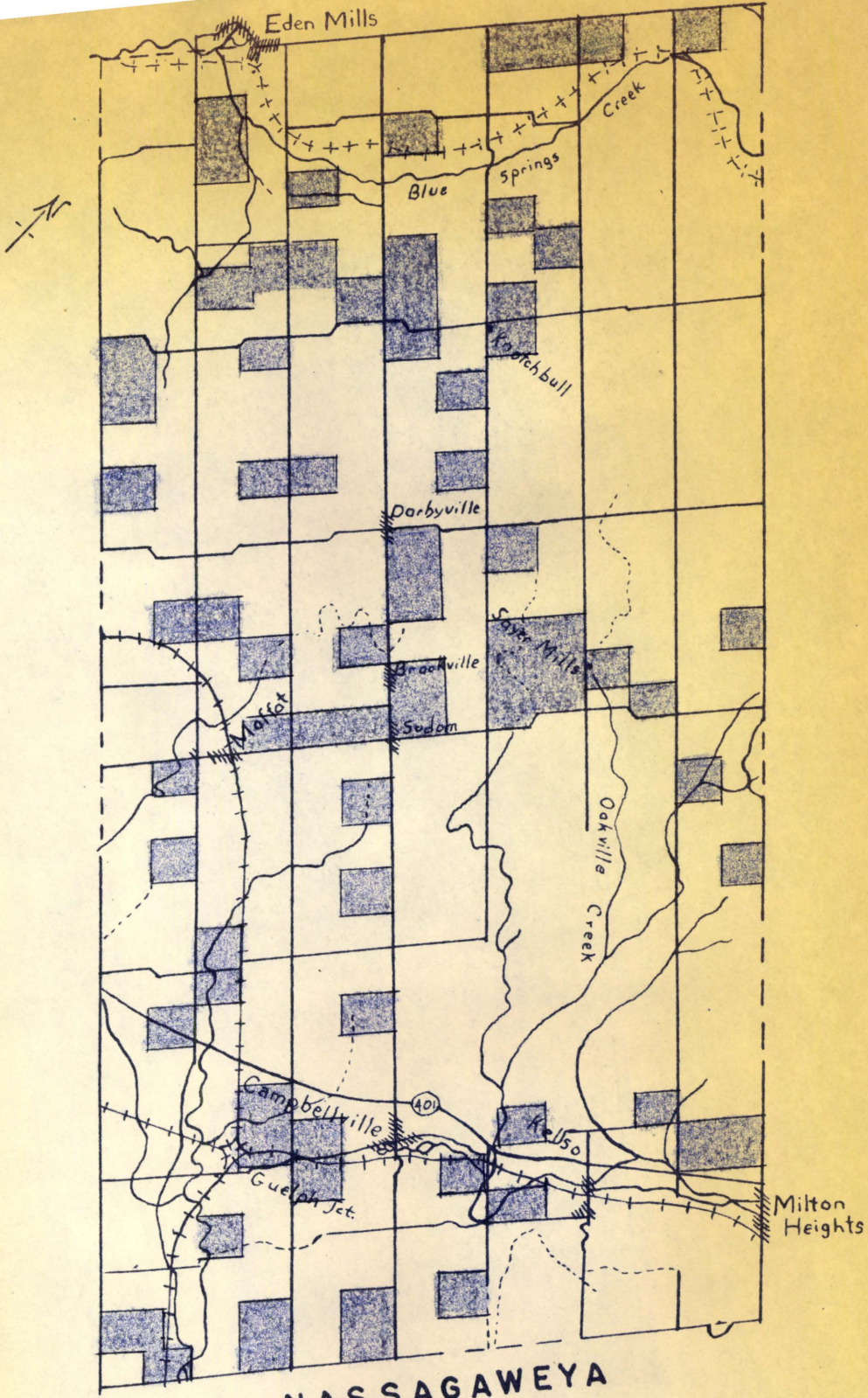
owned by hobby farmers. There is a very marked concentration of beef on the western side of the township. This can be attributed to the fact that G. Campbell, the first in the township to introduce pedigree Shorthorn, is located on Lot 18, Concession 2. This illustrates how farmers cling inherently to their old ways and methods. They accept change slowly and do so only when someone with more initiative makes a success of it. This follow-the-leader characteristic is typical of the conservative backwoods nature of the township.

There are seven farms which keep a flock of sheep, these are located in the northern part of the township on the hilly recessional moraine, as already noted.

Hogs are kept on nearly every farm, but three farms seem to stand out or specialize in hogs. These farms are associated with a large acreage of husking corn on the ground moraine.

Other farms of specialized agriculture, but of minor significance, are; dwarf apple orchards, a turnip processing plant, poultry, horses and a tree farm.

As field work in this report progressed, it became evident that a lot of farms were operated on a part-time basis. Since this appeared to be a very significant factor in the land use, a map showing the location of part-time farmers was prepared from the 1961 voter's list. All persons who occupied lots and whose occupations were listed as something other than farming were plotted on a map. These locations were cross checked with an air photograph to make sure a farm and a farm house existed. Then they were cross checked



**NASSAGAWEYA**

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SCALE: 1 in. = 1 1/2 mi.

FARMS OPERATED  
ON A PART-TIME  
BASIS



with known locations of specialized agriculture and finally put to the test by a few interviews. As a final proof, a percentage, corresponding to the ratio of Nassagaweya's population to that of Halton County, was taken for the number of farmers in the county who worked for more than ten months off the farm. This gave an approximate value of seventy. The number of part-time farmers plotted on the map in this report totalled seventy-five.

This category is very general. It includes hobby farms, workers who supplement their income by farming, and farmers who supplement their income by working at another trade for part of the year.

These part-time farmers have a very significant influence on the land use of the township. There is a pronounced relationship between the location of part-time farmers and the distribution of fallow land. This is a logical association because the part-time farmer is unable to devote enough time to the cultivation of all his land.

Before going any further, I would like to summarize the farm situation in the following table.

Table #1

<u>Types of Farms</u>	<u>Number</u>	<u>Percent</u>
Part-time farms	75	26.8%
Specialized farms	61	21.8%
General farms	<u>144</u>	<u>51.4%</u>
Total	280	100.0%

From this table we can see that slightly more than half of the farms in the township carry on general farming on a

full time basis while slightly more than one quarter farm on a part-time basis. About one fifth of the farms are specialized. This lack of specialization and the number of part-time farmers suggests that agriculture is in an inefficient and backward state compared to the other townships in the county.

The degree of mechanization is the best illustration of this point. Esquesing Township in 1956 had 177 trucks, 495 tractors, and 66 grain combines in comparison with 104 trucks, 248 tractors and 16 grain combines in Nassagaweya. Thus, the former has twice as many tractors, and four times as many grain combines while its number of farmers is only 2/5 larger than Nassagaweya. The great superiority in grain combines is particularly significant since the degree of efficiency is most closely related to heavy farm machinery. A further illustration can be seen by comparing farm values of implements and machinery in Halton County for 1951.

	Total Farmers	%	<u>Table #2</u> <u>ACRES</u> Total Farm Area	Dollars Value of Implements & Machinery	%
Halton	2,035	100%	204,579	6,861,259	100%
Esquesing	492	24%	63,941	1,934,000	28%
Nassagaweya	303	15%	39,414	673,617	9.8%
Nelson	586	29%	40,275	1,892,523	27.6%
Trafalgar	654	32%	60,949	2,360,000	35%

In 1951, Nassagaweya owned only 9.8% of the farm machinery by value while having 15% of the farmers. Esquesing and Trafalgar have greater values of mechanization compared

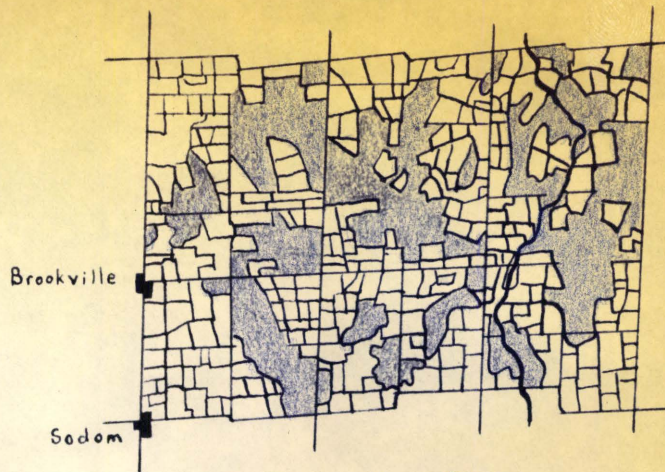
to their percentage of farmers while Nelson runs close to par. Not only does this table illustrate the lack of mechanization in Nassagaweya, but it also points out its backwoods position.

A comparison of field patterns also serves as an illustration of this point. (See p.105). Compared to Trafalgar Township, Nassagaweya has small, irregular and inefficient farm field units. One of the reasons as we have already seen, is the ruggedness of the topography. However, it is mostly caused by the fact that the farmers can't afford the expense of removing the delimiting stone fences built by the early settlers as they cleared the excessively stony fields. These out-dated field units are difficult and inefficient to farm by modern methods.

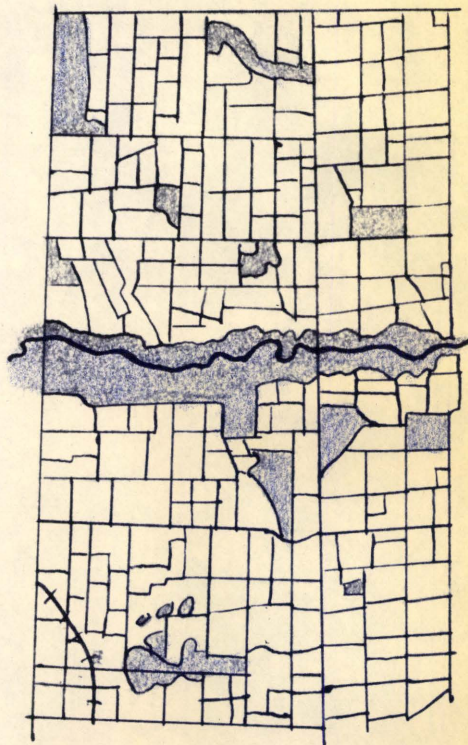
The lack of machinery, characteristic of inefficient farming, means that each farmer must plant a variety of crops in order to spread out his planting and harvesting time. This tends to keep the field unit small. Even though a farmer knows that corn is the best feed crop, having more food value and higher yield than any other crop, he can only plant a limited amount because he lacks the facilities to harvest a large acreage within a short space of time. This explains the heterogeneous complexity of the field crop pattern as seen on the land use map.

This inefficiency resulting in low farm income has caused farmers to seek employment off the farm. This accounts for the number of part-time farmers in the township. Moreover, it has created a frame of mind and outlook in the farmer that makes him willing to sell his land. This has created an

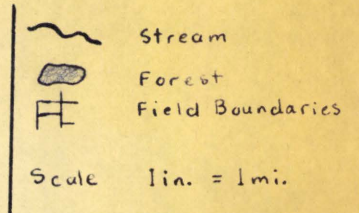




TYPICAL FIELD PATTERN  
of  
NASSAGAWEYA TOWNSHIP



TYPICAL FIELD PATTERN  
of  
TRAFALGAR TOWNSHIP



Illustration





Fig. 35. Stone fences such as these are common throughout the township. They are very expensive to remove and are indicative of an inefficient state of agriculture, caused by small irregular farm field units.

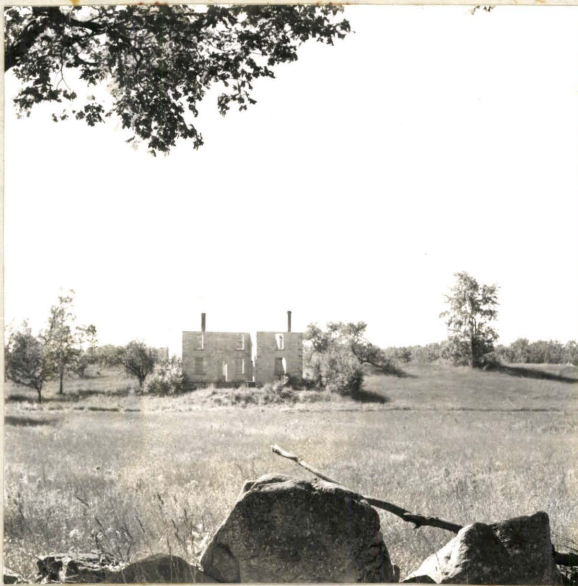


Fig. 36. Inefficiency of agriculture has caused the abandonment of many farms such as the example above.

interesting characteristic of the farm economy in that part of the township peripheral to the limestone plain, east and south of Sodom. This area has a concentration of part-time and tenant farmers. Some five thousand acres in this vicinity has been purchased by Germans still living in Germany. This whole scheme has been carried out by a few German settlers in the township. This investment has been brought about by the tense political situation in Germany in recent years, causing wealthy German industrialists to convert their savings into property holdings in a nice safe place like Canada. Their attention was directed to Nassagaweya when Wolf von Richthofen settled near Sodom a few years ago.

Now, farmers are tenants on their own farms bought up by German investment. The farmers appear to be quite happy about this situation as they reportedly received a very good price for their farms. Many are driving new cars, some have built new homes and retired, in general, all have a very satisfied outlook on life.

All of this has resulted in a general lack of cultivated land, a great deal of unimproved pasture as well as fallow land.

With farmers willing to sell out, there also appears to be a trend in buying up old farms and turning them into hobby farms or estates. The township is well suited to this. It has beautiful wooded surroundings, large, fine, old stone houses that can be converted into attractive country homes, and it is not far from large urban areas. In the words of Mr. G. Campbell, a prominent member of Nassagaweya's recently formed planning board, "We would like to see more of the township turned into estates of one hundred acres". This



would discourage another outgrowth of this inefficient farm economy, the selling of farm frontage for urban strip development.

It can be said in summary that there are a number of important present day factors involved in the land use. It is an area of mixed farming with an emphasis on cattle and hogs, but dairying is fairly important. A fairly large part of the township is held by absentee German landlords. Hobby farmers and part-time farmers are a significant part of the agricultural economy. The township, in general, is a backwoods area with a very inefficient farm economy, caught between restrictions left over from its past, restrictions resulting from physiography, and the need for modern methods and machinery. The result is a great deal of idle land or abandoned land and farmers that are willing to sell their farm frontage for subdivision and development of suburban strip development.

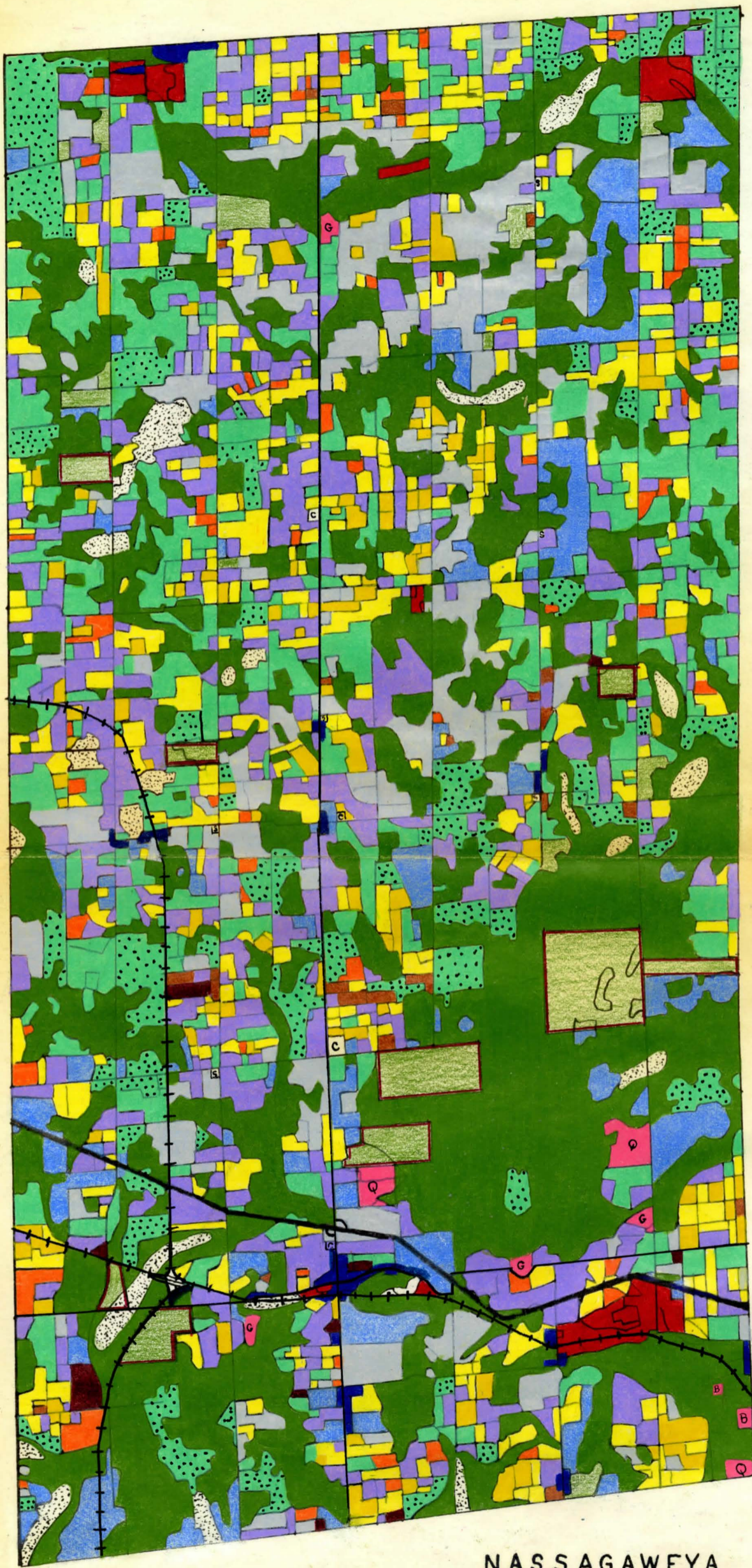
(ii) Types of Land Use:

A. Agricultural Land Use.

(a) Pasture.

In this thesis pasture has been classified into two main groups; Permanent Pasture, and Pasture in Rotation. Permanent pasture consists of two classes, improved and unimproved. During the field work for this thesis these two were distinguished in the following way. Improved pasture was any cleared farm land which showed definite signs of previous cultivation with grains or hay crop, cleared of





# LAND USE MAP 1961

## Agricultural Use

- Oats [Yellow]
- Wheat [Light Yellow]
- Corn [Orange]
- Hay Crops [Purple]
- Permanent Pasture
  - Improved [Light Green]
  - Unimproved [Green with dots]
- Pasture in Rotation [Light Blue]
- Orchard [Dark Red]
- Vegetable Crops [Brown]
- Other Use [White]
- Idle Land [Blue]
- Forest Land [Dark Green]
  - Reforest Plots [Green with diagonal lines]
  - County Tracts [Green with horizontal lines]
- Urban [Dark Blue]
- Recreational [Red]
- Stone Quarry [Pink with Q]
- Gravel Pit [Pink with G]
- Clay Pit [Pink with B]
- School [White with S]
- Church [White with C]
- Railway [Black with cross-ticks]
- Highway 401 [Black with double lines]
- Swamp [White with dots]

NASSAGAWEYA  
TOWNSHIP  
SCALE: 1 in. = 1 mi.



stones, boulders, and stumps, and planted with pasture grass. Unimproved pasture was any farmland that was cleared of forest but contained stumps or stones and boulders or on shallow soils with bedrock outcrops or overgrown with hawthorn, willow scrub or other weeds.

Pasture in Rotation is a rather catch-all phrase as used here in this thesis. It might readily be called fallow land and, quite possibly, in some cases it might include land in early stages of abandonment. But most often it was found that it was being used for summer pasture while lying fallow. Hence I have called it pasture in rotation rather than fallow land to convey the impression that it had some temporary use. This land was mostly grown over with weeds but showed signs of having been cultivated.

Unfortunately, classification of pasture land is highly subjective, so that acreage values arrived at in this report do not compare well with those presented in the Canadian Census Report. However, a correlation is very easily attained. Allowance must be made for the fact that the census is five years old. The census categories involved are; fallow land, improved pasture, and natural pasture. Natural pasture corresponds to unimproved pasture in this thesis except that the census category includes pastured woodlots. This explains the discrepancy between the 5,004 acres of unimproved pasture attained in this report and the 6,719 acres of natural pasture in the 1956 census.

Fallow land and improved pasture in total correspond to the sum of Pasture in Rotation and improved pasture in this report. The fact that some fallow land may be pastured more intensively than some other has resulted in a great



deal of what I call pasture in rotation to be classified as improved pasture.

According to my work, there were 4,044 acres of improved pasture in the township. The characteristic of this land use type was that it very rarely occurred in large single tracts and was directly associated with areas of intense cultivation or specialization.

On the other hand, unimproved pasture covered 5,004 acres and usually occurred in large units. It was directly associated with agricultural areas marginal to the limestone plain and poorly drained areas, or hummocky, stony, areas of the Galt and Paris moraines. A large percentage of this land type has a low carrying capacity for livestock and would be more efficiently used if it were returned to forest cover.

Together, this permanent pasture classification covers 9,048 acres and is the largest single agricultural land use type. It makes up 19.5% of the township's acreage, and is second in area only to the forests.

Pasture in rotation covers 3,362 acres of the township and as such is the fourth largest single land use type next to hay with 7% of the total area. It is found mostly in the poor stony areas of the moraine.

In summation, permanent pasture with 19.5% and pasture in rotation with 7% of the township's total acreage make up a grand total of 26.5% of the land use in the township.

(b) Hay Crops.

Hay crops as indicated on the land use map include alfalfa, clover and grass. These crops together make up



Fig. 37.

An extreme example of permanent improved pasture, a sea of lush green grass. This type of pasture is indicative of a specialized agricultural economy which is very efficient and productive.



Fig. 38.

An extreme example of unimproved pasture, full of boulders, stumps and weeds. The carrying capacity of such pasture is very low and therefore it is a very inefficient land use. This land would be put to more efficient use if it were reforested.

the majority of the cultivated crops, having three times as much acreage as oats, the largest grain crop. In 1956 there were 5,525 acres of cultivated hay. Although no census material is available for 1961, a planimeter measurement of the hay crop classification on the land use map prepared for this thesis showed that there was 6,048 acres of cultivated hay in the township. With this figure, an increase of approximately 500 acres over 1956, hay has reached, as was expected, an all time high in production. Not only is hay the largest cultivated crop, it is the third largest single user of land in the township, covering 13% of the total area.

Although no record was kept, it appeared that alfalfa was the predominant hay crop. It was grown in conjunction with grains on every farm, with no specific relationship with any particular soil type or physiographic unit, although it was not found in poorly drained areas or on shallow soils. The Dfb climate of this part of Ontario is ideal for this crop. Alfalfa has a higher yeild per acre, a higher feed value, and therefore supports a large number of animal units than any other hay crop. \*1 Moreover, it has a high carrying capacity as a pasture crop, and is an important soil builder. There is "no other crop which is so essential in relation to the livestock industry, so useful to rotate with other crops, or so valuable in proportion to the cost of production". \*2 For this reason, alfalfa is a very important crop in Nassagaweya Township.

The hay crop association also contains clover and

\*1 Klages, K., Ecological Crop Geography, MacMillan Co., New York, 1958. P. 532.

\*2 Ibid., P. 533.



grass. Clover produces a hay of excellent quality with a high protein and mineral content. It is extensively used in crop rotation systems and in pasture mixtures because it is long lived and is more persistent than some hay crops. Thus, clover and grasses were mostly found being used for pasture rather than pure hay production.

(c) Grain Crops.

Grain crops in this land use classification include oats, wheat, and corn. Mixed-grain, consisting of oats and barley is grown in the township but oats predominate in the mixture and during the summer, when this field survey was done, the oats stood well above the barley so that it was very difficult to identify the mixture without entering each field. For these reasons probable mixed grains were classified as oats. Barley and rye were identified in a few fields but were of such minor significance that they were not worth mapping and so were included in the wheat classification in order to reduce the number of categories in the land use legend.

The area of grain crops, has been decreasing steadily during the last decade. The total area in 1956, according to the census, was 6,231 acres. This was a decrease of 1,684 acres from the 1951 census. The area of grain crops in 1961 as planimetered from the land use map was approximately 4,000 acres. This was a decrease of approximately 2,200 acres from 1956. In comparison with grain production in other census years, it has reached its lowest ebb in the recorded statistical history of the township. The reason for this is that there is more emphasis on hay crop and pasture. Other reasons

may be the increase of fallow and abandoned land associated with the increase of part-time farmers.

In Nassagaweya Township as in the rest of Southern Ontario, oats rank first in value as a grain crop.\*1 The climate is conducive, and the soils meet its easily satisfied requirements. The estimated acreage of oats in the township is 2,000 acres. (This is allowing 500 acres for mixed grains). The yield was very high this year because of a wet summer. The oats are produced exclusively as a feed for livestock because of their relatively high fat, protein and mineral content. They are grown throughout the township in combination with hay, wheat, and occasionally corn, where ever intensive cultivation occurs. However, oats particularly stand out on the sandy and gravelly parts of the Paris moraine in the northern part of the township which are not conducive to wheat production.

Wheat is the second major grain crop. In 1956 the census reported 1,644 acres, a planimeter measurement in this survey showed 1,248 acres for 1961. The climate of Nassagaweya, although by no means an optimum will support it. Wheat is quite specific in its soil requirements. For this reason it is only grown on the loam soils of the township which have good water holding capacities and good drainage. The wheat produced in the township cannot approach the quality of western wheat and is therefore not of any commercial value for human consumption. It is used solely as a feed crop for livestock. It is grown in combination with hay and oats and in some cases in lieu of corn, on the better

\*1 Klages, K., Op. Cit., P. 375.

loam soils found in drumlinized till area and in the south-eastern part of the township. It is not found on the coarse or sandy soils of the Galt and Paris moraine. Since oats are so well adapted to the climate and soils of the township, the question may be asked, why bother with wheat at all? The reasons are simply that wheat, grown as a major crop throughout the township's history, continues to be used because of habit, and because it adds variety to the farm production and spreads the harvesting time over a longer period. In other words it is convenient to grow wheat in a farm economy which does not have a great deal of machinery or is run on a part-time basis.

Corn ranks third in acreage of cultivated grain crops on the land use map prepared for this thesis. In 1961 there were approximately 1,000 acres in the township while in 1956 there were only 561 acres. Thus corn is the only grain crop which is increasing in acreage in the township. The climate and soil of Nassagaweya are not the optimum for corn production but the summer temperatures and moisture supply are sufficient for corn growth. The loam soils of the township are suitable although the phosphorus supply is low. Corn is one of the best feed crops for livestock. It produces more feed per acre than any other grain crop. All the corn in the township is grown to be fed to animals, either as husking corn, where only the ears are picked and stored in bins, or as silage, where the whole plant is harvested, cut up, and stored in the silo as green fodder. These two types of corn have different distribution characteristics. Husking corn is generally grown on very large acreage and is associated





Fig. 39.

A field of oats on a dairy farm. Notice the Holstein cattle in the background. Oats rank as the most important fodder grain in the township. (Notice the fine stone house which is characteristic of the area).



Fig. 40.

Large unit areas of husking corn are grown in the township as feed for hogs. Smaller corn fields produce ensilage corn for cattle.

with farms which specialize in hog production. These are found mostly in the southwestern part of the township. Ensilage corn is found in a much wider distribution. It is grown in small acreage in association with hay and other grain crops. It is directly associated with the dairy farms and some mixed farms which emphasize cattle and dairy production. On these farms anywhere from ten to twenty acres were devoted to corn production while on farms producing hogs, up to 100 acres of corn was grown.

In summary, it appears that there is a steady decline in all grain crops except corn. Cultivated grains occupy approximately 4,750 acres which is 10% of the total area of the township. Grain crops are the fourth largest land user.

(d) Other Crops.

Other agricultural land uses that were mapped are orchards and vegetables. These two make up a very small but distinctive part of the land use of the township.

Orchards consist of two kinds; small old orchards associated with the farm yard, and newly planted orchards of dwarf trees which cover extensive acreage.

The first type is a remnant of the old self-sufficient farm during the initial stages of development in agriculture in the township. These orchards are, almost without exception, located adjacent to the farm buildings. They provide tree fruits for the farm and a very small amount for sale locally. In most cases these orchards are uncared for, the fruit is wormy and most of the trees are dying out.

The second type of orchard is the dwarf tree. There are three dwarf orchards in the township but only two are

specialist plantings. They consist mostly of apple and pear trees. The dwarf tree is well adapted to this area because it has a late bloom and escapes any danger of frost. They have an earlier harvest and therefore get an early market advantage. The size of the trees makes harvesting very simple and they produce a very fine quality fruit. Production is just as high as for larger trees because many small ones can be planted in an area required for a large one. The three dwarf tree farmers are Dutch-Canadians and acquired their skill and knowledge in their native country.

Mr. W. Vandervinde, after the war, planted the first large scale dwarf orchard and at present he has forty acres of trees and is still expanding. There are 300 trees to an acre. He imports the root stalk from Holland and does the grafting himself. The apples are shipped to the food terminal in Toronto.

Mr. Traar has twenty-five acres of dwarf trees and there are a few acres of trees on the farm of Schouten and Sons. The degree of success of this operation is being closely watched by the Department of Agriculture. It is quite possible that a new trend towards dwarf trees may be starting in this area as production in the Niagara fruit belt declines in the face of spreading urbanization and industry.

Vegetables are of relatively minor significance. Most are used or sold locally. The exception is turnips. Three quarters of the vegetable acreage in the township consist of turnip. In 1956 there were 400 acres. All the turnips in the township are processed locally at the Schouten





Fig. 41.

A recent development in the township is the introduction of dwarf apple orchards. The late bloom and fine quality fruit are a very favourable aspect of this orchard type.

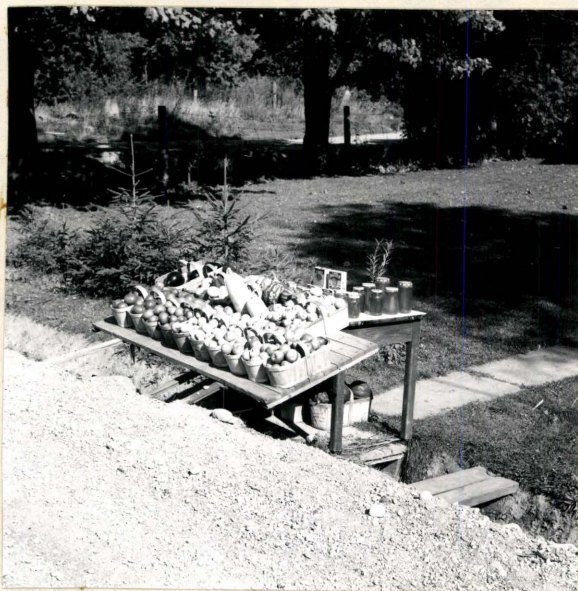


Fig. 42.

Most of the vegetables, with the exception of turnips, are used or sold locally. This small stand was located on the Guelph Line below Campbellville.

and Sons processing plant, the product being shipped to the United States. The building of this plant just north of Campbellville has caused an increase of turnip production, most of which is concentrated in the central and southern part of the township close to the plant. The turnips are grown on the larger vegetable field units.

## B. Other Land Uses.

### (a) Idle Land.

This classification includes land which has been abandoned or taken out of productive use for a long time. There are approximately 2,636 acres of this category in the township. Much is overgrown with bushes and saplings and, usually, has abandoned buildings. It makes up about 5.6% of the total area and is the fifth largest single use of land. It is found on or adjacent to the poor areas of the limestone plain, or the stony moraine. A lot of this land is being held idle for speculation.

### (b) Forest Land.

As we have already seen in an earlier chapter, there are 15,000 acres of forest land. This is 31% of the total area, and makes the forest the largest land use classification in the township. This classification comprises cut over forests, (which were thoroughly described in Chapter 1,) private reforested plots, and county forest tracts.

There are thirty-four private plantations covering one hundred and fifty-eight acres. Most of these plantations consist of Scotch pine which are grown commercially





Fig. 43.

A number of forest tracts have been set aside by the Department of Lands and Forests to preserve the forests in this headwater area of three watersheds.



Fig. 44.

Beaver dams on the limestone plain area have flooded wide areas of forest land killing valuable timber supplies and destroying headwater forest cover.



for sale at Christmas. To date 129,253 trees have been planted for this purpose. These plantations are found on coarse stony moraine and limestone plain areas.

In an effort to preserve the forests of Nassagaweya, the Ontario Department of Lands and Forests has set aside eight county forest tracts, covering an area of 1,176 acres, mostly on the limestone plain, and removed all the beaver who were destroying large plots of forest by flooding wide areas in the headwater region.

The forests are still commercially important. There are three saw mills at present; Bock and Lack, Lot 24, Con. 5, Gilbertson's mill, at Eden Mills, and E. Thomas' mill, Lot 28, Con. 2. Hemlock, white pine, white spruce and cedar are some of the softwoods still sawn, while the hardwoods consist of white elm, hard maple, ironwood, beech, and oak. Lumber and fence posts are the main commercial products. Fuelwood makes up the largest part of the forest products cut, but most of it is used on the farm.

(c) Urban.

As we have seen in an earlier chapter, the population of Nassagaweya is increasing for the first time in over sixty years. Most of this increase is the result of an influx of part-time farmers and non-farm residents. In 1956 the total population was 2,261 of which 632 were non-farmers. The majority of these people live in the urban communities but there has been a very substantial increase in strip urban development along the roads.

Campbellville: Campbellville is the largest village in the township. In 1951 its population was 225, today it

is 364. It is the business and cultural centre for the southern portion of the township, located where all the major means of transportation intersect. Highway 401 passes to the north of the village with the only cloverleaf access in the township, while the only two asphalt surfaced county roads, the Guelph Line and Number Five side road intersect in the heart of the village just north of the main line of the C.P.R. It is a typical junction hamlet spread out along both sides of the intersection. As a cultural and social centre it has a large church, a public school, a community hall, and a Masonic Lodge. As a business centre it has a bank, two grocery stores, (one of which is run along the lines of a supermarket), a farm equipment dealer, a post office, a service station and garage, a coal yard, a barber shop, a beauty shop, and a television repair shop. The only industry associated with the village is King Calcium Products, (Crawford's saw mill burned down in 1951). This company manufactures a bug killer which is distributed from Manitoba to the Maritimes.

Many fine homes have been built here in the past half century most of which are clustered around the intersection. There are many attractive wooded building sites available and recent construction of new homes has given the community a ribbon appearance particularly along Number Five side road. It is expected that the combination of inexpensive building sites and the Highway 401 access will bring a building boom to the community. As proof of this, a three million dollar race track will soon be built just north of the village.

Zoning in the Campbellville area is at present one



Fig. 45a.

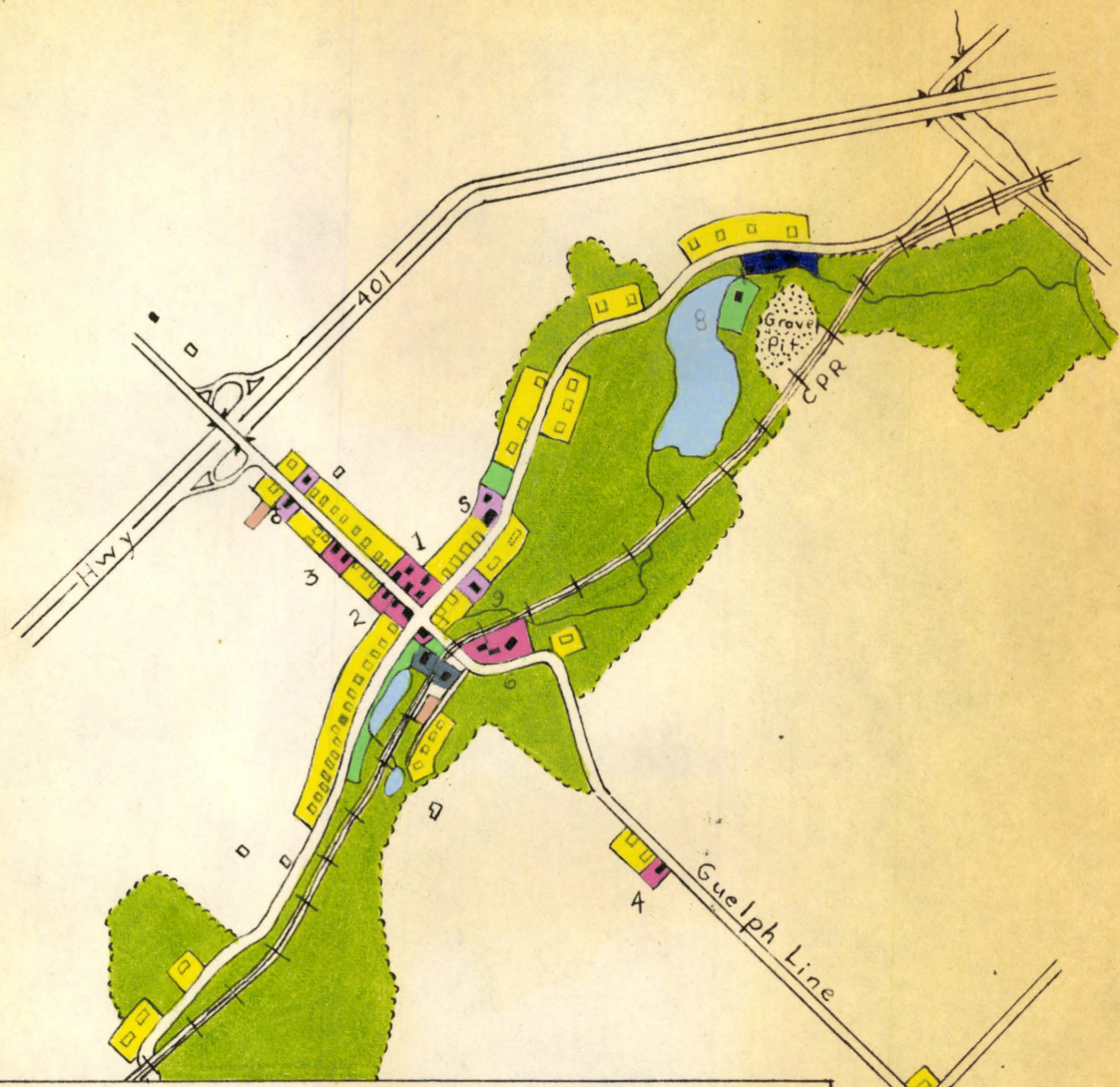
The Guelph Line and Number Five side road from the core of Campbellville. Here looking south on the Guelph Line are two grocery stores and the office of King Calcium Products.



Fig. 45b.

Many fine homes have been built in Campbellville during the past half century, here is an example.





Campbellville











Residential		1 Post Office, Service Stn., Beauty Shop, T.V. Repair.
Commercial		2 Grocery Stores, Barber Shop, Office.
Public Buildings		3 Bank, Farm Equipment
Transportation		4 Plumber
Industrial		5 Restaurant
Park		6 Coal and Lumber
Cemetery		7 King Calcium products
Forest		8 Fishing Club
Farmland		9 Masonic Lodge
Pond		⊕ Church S School





Fig. 46a.

Campbellville's only industry, King Calcium Products, ships bug killer from Manitoba to the Maritimes. This factory first opened as a woollen mill in 1847.



Fig. 46b.

Poor quality houses characterize strip development along the Guelph Line south of Campbellville. There is an urgent need for zoning by-laws in this area.

of the major goals of the township planning board. Cheap lots located on idle land and abandoned farm land just south of the village are attracting many individualists and there is a serious threat of uncontrolled strip development along the Guelph Line. It has already started at the intersection south of Campbellville. (See Fig. 46.)

The railway has not attracted industry to Campbellville because it runs in a rather confined valley until it reaches Guelph Junction. From this junction, approximately one mile west of the village, the C.P.R. branches north to Guelph and south to Hamilton. This rail junction with its sidings is located in the centre of a flat, wide open area. However, it has not attracted any industry at all. The reasons being, this is a limestone plain area which is rather imperfectly drained, and because there is a lack of large rivers in this headwater region, there are no water or sewerage facilities. This in itself may be a very important reason why Campbellville has been overlooked in the past. The only buildings at Guelph Junction are a boarding house and a few houses of railway employees.

Eden Mills: This is the second largest community in the township and the fastest growing. The core lies in Eramosa Township but in the last decade there has been a great deal of development on the Nassagaweya side of the line. In 1951 the population in Nassagaweya was 63, in 1961 it was 216. The number of people in Nassagaweya side of Eden Mills has tripled while that part in Eramosa has risen only slightly. However, this increase is almost entirely the result of a large scale development of poor quality cottage type homes adjacent to Mohawk Camp and Edgewood Park.





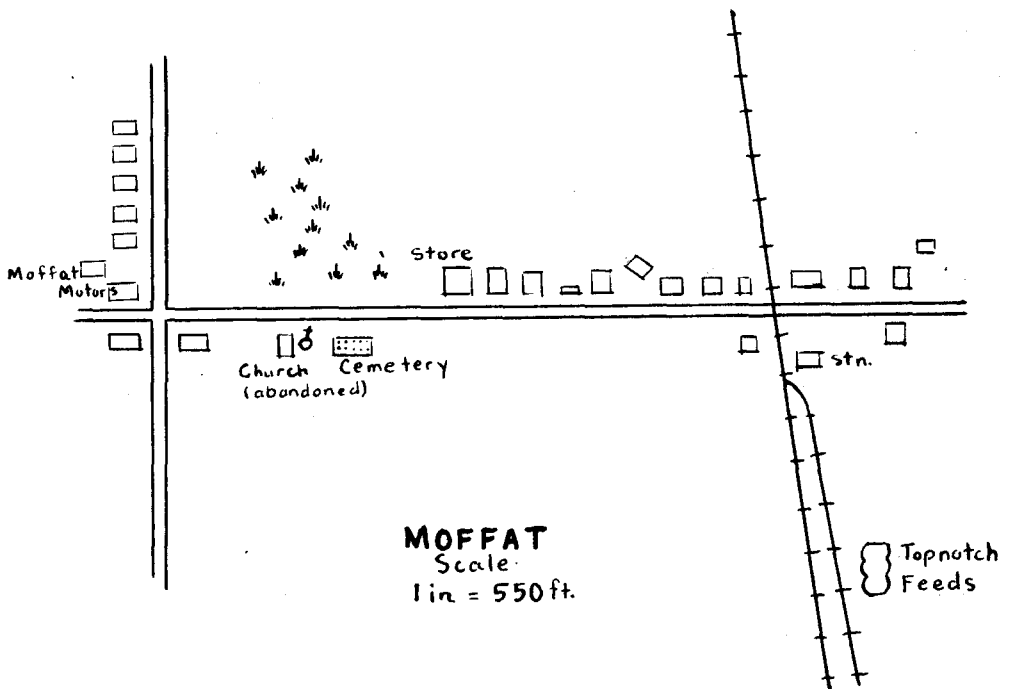
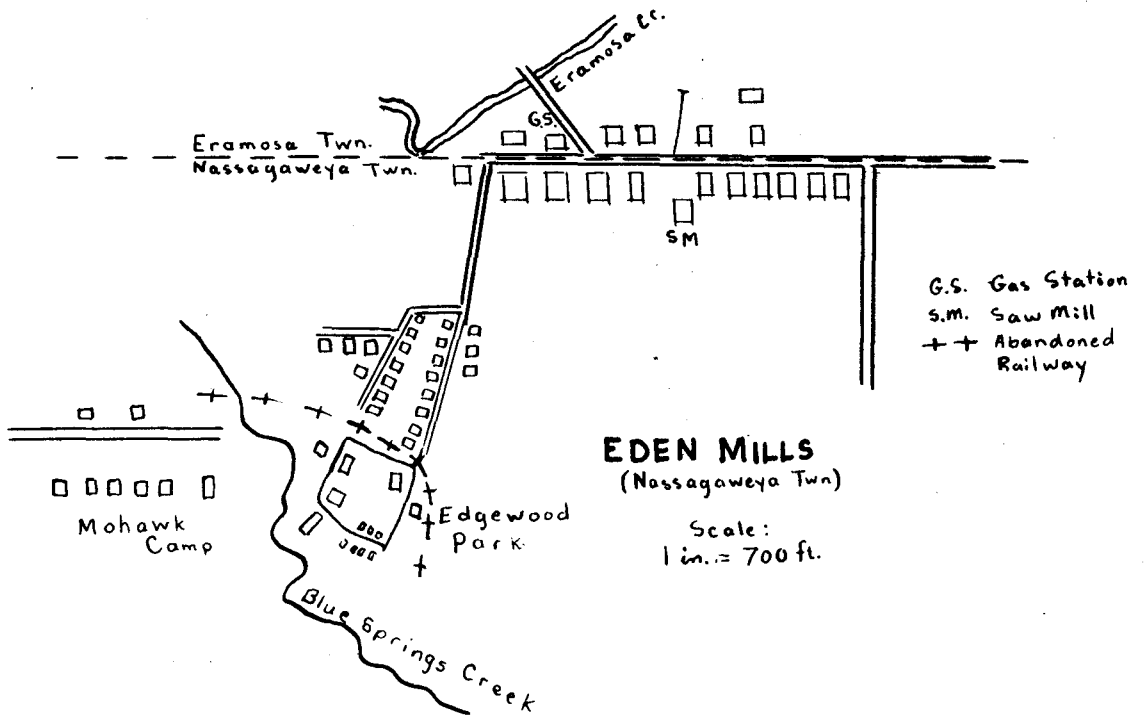
Fig. 47.

Guelph Junction offers excellent railway facilities, one mile west of Campbellville, but no industry has been attracted here.



Fig. 48.

An example of the poor quality houses built on low cost land in the valley of the Blue Springs Creek at Eden Mills. This particular area is known as Mohawk Camp.



Illustration

TABLE #3

Population of Eden Mills

Eden Mills	<u>1951</u>	<u>1953</u>	<u>1955</u>	<u>1961</u>
Nassagaweya Twn.	63	154	184	216
Eramosa Twn.	122	113	123	<u>160</u>
			Total	376

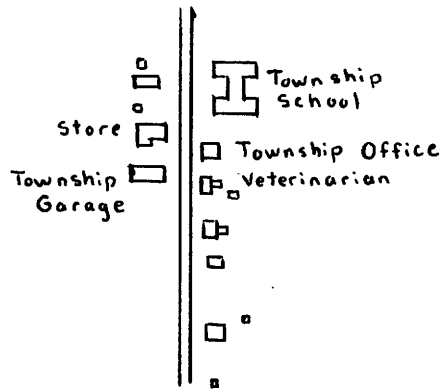
The remainder of Eden Mills in Nassagaweya is located along the county line. This area consists of ten old stone homes that date before 1900 and a saw mill.

Moffat: This community has remained relatively unchanged for the last few decades except for the building of some new houses on the east side of the C.P.R. tracks. Moffat Motors is the main commercial activity. It contains a garage, grocery store, and electrical appliances. There is one other small grocery store. There are no industrial activities in the community at all. The church was abandoned a number of years ago. The station appears to be closed but the grain elevator seems to be still in use.

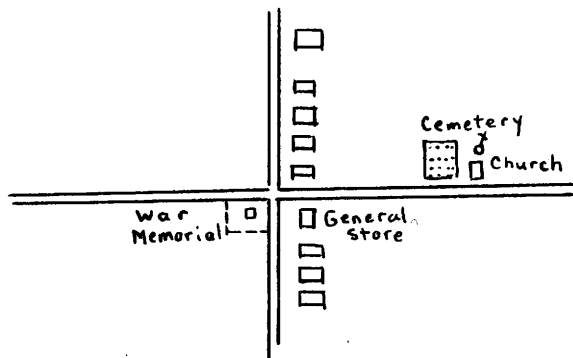
The community doesn't have any important function and can be considered to be in a state of decay. The present population is about fifty.

Brookville: One factor has saved Brookville from disappearing like Darbyville and Knatchbull and that is the township office. The fire in 1900 all but wiped out the community, but the township hall was saved. Now a brand new township school and a large township maintenance garage are located here. The only commercial function in the village, a store, carries very little merchandize and seems





BROOKVILLE



SODOM  
(Haltonville)

Scale  
1 in. = 1050 ft.

Illustration

ready to close down. There are a few residences, one of which is the home of the local veterinarian.

Sodom: This community, once thriving, now consists of seven old residences, a general store, a church, and a war memorial. The general store is located in what was once a creamery. It is one of the better stocked stores in the township and also serves as a gas station. The large war memorial for Nassagaweya Township is a rather unusual feature of this small hamlet. The only reasons that I can assess for this being here rather than at Brookville or Campbellville, is the fact that it is a centrally located intersection and once served as the "drum beating" centre of the township.

Milton Heights: This is a small community that has grown in response to the brick manufacturing and lime burning industry. It is really a suburb of Milton. It is extended along the concession road and most of it is located on the Esquesing side of the line. The community consists of two distinct halves. The old core is found around the railway tracks and a small new subdivision is located close to Highway 401.

This community along with Campbellville and Eden Mills is the only village to show signs of recent growth.

There are two recent urban strip developments which are not associated with any existing community. One of these is at Sayer Mills, and the other, at the southern end of the fifth concession. Both these strips consist of a mixture of good and poor quality homes, located on abandoned land that was obtained at low cost. In an interview with a builder who is very actively engaged in this suburban strip

development, it was disclosed that roadside lots were selling for \$1,000.00 an acre, and he in turn was selling a house and lot for \$12,000.00 .

(d) Recreation.

Recreation reflects the backwoods character of this area and its clear flowing streams. Recreational use predominates in the Blue Springs Creek valley. Most of the valley is privately owned and kept as a trout fishing retreat. But parts of the valley have been developed for public recreation. Edgewood Park is a church camp at Eden Mills run by the Lutheran Church. It has a number of cabins, a large dining hall and many other facilities, including a swimming tank on the Blue Springs Creek. Mohawk Camp, across the Creek from the church camp, is a low rent cottage camp which has attracted a number of year round residents. A large tract of land on the valley side behind the camp, is used by the Guelph Rod and Gun Club for skeet shooting.

In the fourth concession there is a recreational site which is not associated with the creek. Here some hobby railroaders have constructed part of the old abandoned electrical railway system and run an old trolley, both for personal and public enjoyment.

In the seventh concession there is a large area which has been fenced off and belongs to the Blue Springs Scout Reserve. This scout camp straddles the Blue Springs Creek in a heavily forested valley. It is an ideal location for scouting. There is a kitchen, a chapel, and a few cabins, but most of the boys sleep in tents.

Centrally located in the fourth concession is the



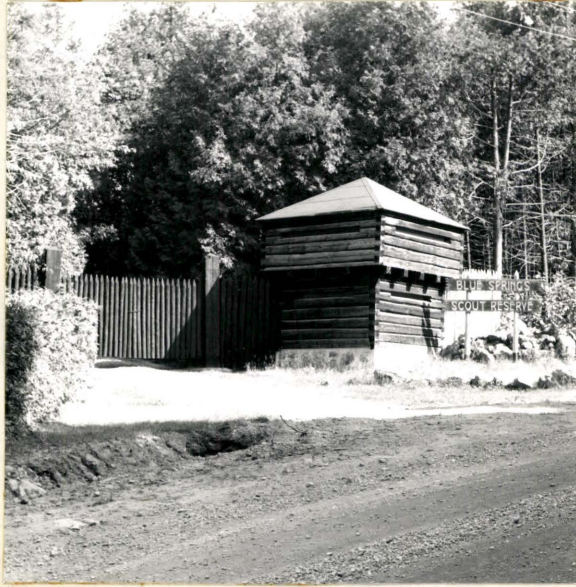


Fig. 49. The Blue Springs Scout Reserve on the Blue Springs Creek is a large forested camping area.



Fig. 50. Edgewood Park at Eden Mills is a large attractive church camp on the Blue Springs Creek.

Sunny Acres Nudist Camp. It is a very small enterprise at present and reflects the privacy afforded by the backwoods nature of the township. It is located in a wooded valley.

There are two small recreational classifications in Campbellville, both being old mill ponds. One is a roadside park and swimming pond and the other is owned by a local fishing club. The latter is at present being put to poor use and should be turned over to the public.

The largest and newest recreational site in the township is located on the West Branch of the Oakville Creek. This site is related to the Kelso Dam conservation project designed to prevent flooding downstream. A large earth dam has been constructed which will form an 85 acre lake. The dam is scheduled for completion on December 4, 1961. A ten year plan of development is proposed for this site. The Glen Eden Ski Club has already opened for business on the same slopes of the Niagara escarpment behind the lake. A swimming and wading pool will be ready for the summer of 1962. The remainder of the hilly pastured park area will be turned into a picnic area, soon. In the future, a pioneer village is to be built as well as a boat launch and marina for the lake which will be stocked with fish. Camping facilities adjacent to Highway 401 are also in the plan as well as nature trails along the wooded escarpment edge. The entire park at present encloses 266 acres and more land has been proposed for purchase. This is the most accessible, attractive, recreational site in the township.

As mentioned earlier, a new \$3,000,000.00 harness race track is to be built near Campbellville by the Jockey Club Limited of Ontario. Construction is to start in the

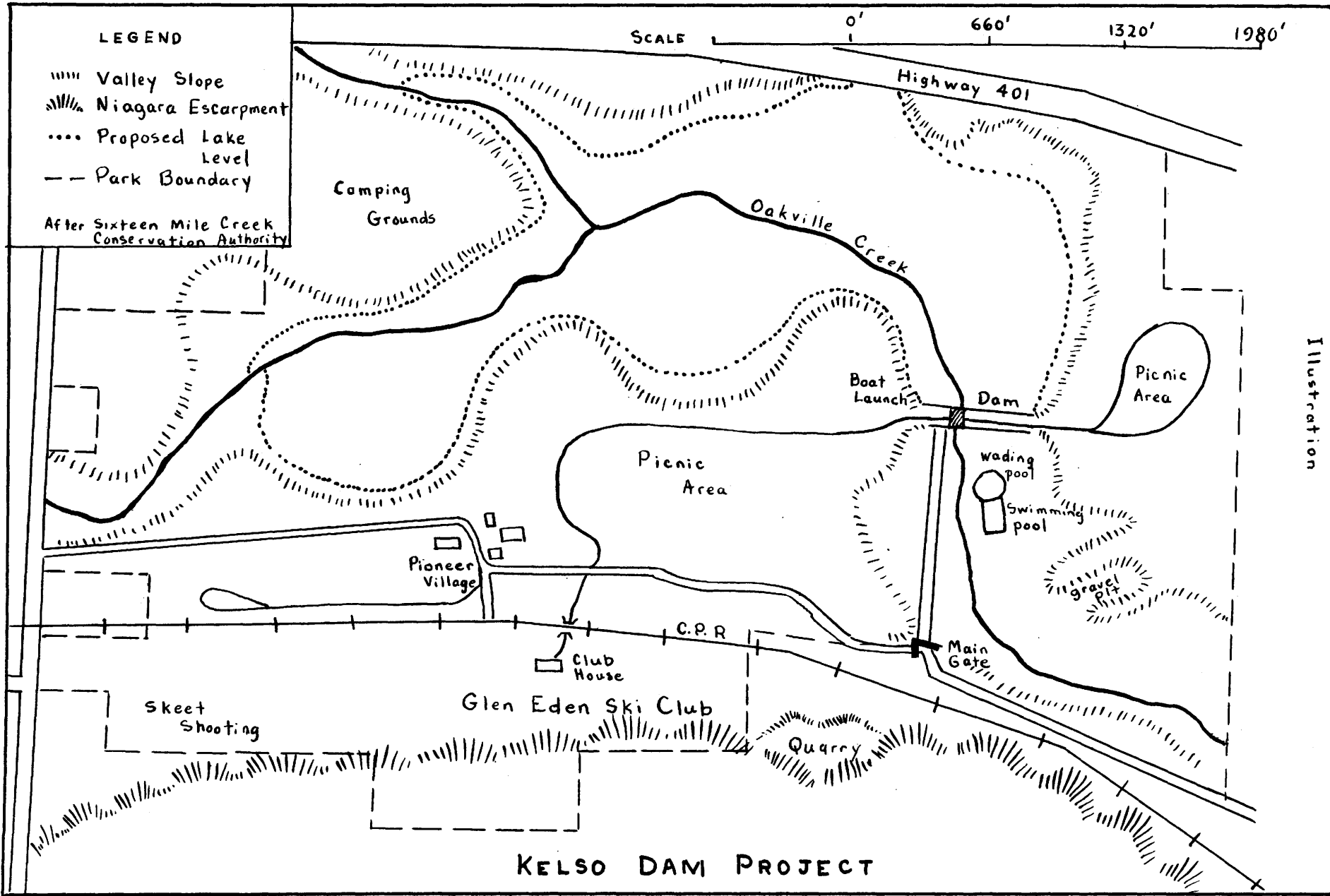
LEGEND

- ▨ Valley Slope
- ▨ Niagara Escarpment
- ⋯ Proposed Lake Level
- - Park Boundary

After Sixteen Mile Creek Conservation Authority

SCALE

0' 660' 1320' 1980'



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Illustration

KELSO DAM PROJECT



spring of 1962, with 1963 as the target completion date. This five furlong track will cover 400 acres in Concession 3 just north of the village, adjacent to Highway 401. Initially it will seat 3,000 persons with stables for 600 horses and living accommodations for 200 men.

Wolfgang von Richthofen who breeds standardbreds and trains thoroughbreds near Sodom, has played an important part in bringing this recreational industry to the township. Also the fact that a large area of cheap land was available close to Highway 401 is significant. At present, harness racing in this vicinity is limited to the overcrowded Toronto Woodbine track which is used mostly for flat racing. This new track will bring Ontario into the well established Montreal, New York, and Buffalo harness circuit.

The influence of this new race track has already affected the township. It had been dry until August 1961 when the people voted in favour of liquor and beverage rooms.

These are the recreational facilities of the township. They are surprisingly extensive, considering that there are no lakes or large rivers. They can be attributed to the backwoods location and the nature of the township which has preserved its clean, unspoiled forest and water resources.

(e) Industry.

Nassagaweya Township has very little industry. Most of what it has is based on the bedrock resources of the area. Even the King Calcium Company, which has already been discussed, used to use a local source of lime in its product.

The making of bricks has, for a long time, been the major industrial activity. Until a few years ago there were

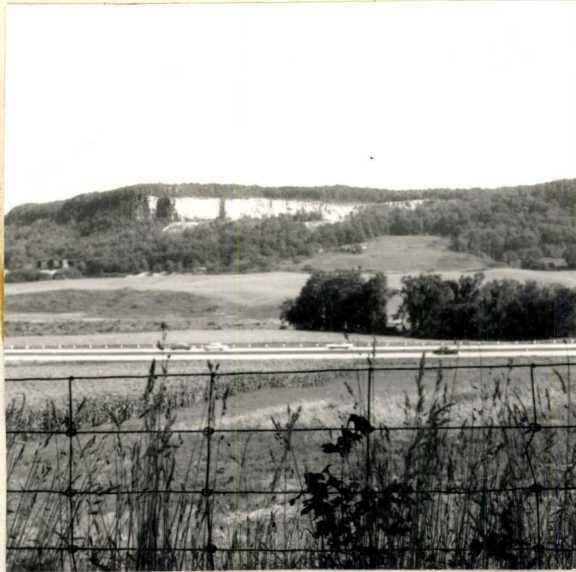


Fig. 51.

The Kelso dam project. The area of dark shading in the middle of the foreground indicates the valley to be flooded by the dam adjacent to Highway 401. The escarpment gives an impressive scenic quality to this natural park land and offers excellent ski slopes to winter sport enthusiasts.



Fig. 52.

The Milton Brick Company is one of the largest industries in the township, based on local bed-rock resources.

two companies using the local resources of Queenston shale; the Inter-Provincial Brick Company and the Milton Brick Company. Both originated with the building of the railway, as noted.

The Inter-Provincial Brick Company, a subsidiary of the Cooksville Brick Company, employed thirty-five men and produced 33,000 bricks per day before it was forced to close down for lack of clay resources. All the land containing shale deposits had been bought up by the more enterprising Milton Brick Company.

The Milton Brick Company has its clay pits in Nassagaweya but its ovens are across the line in Esquesing Township. It employs ninety to one hundred men and produces two million bricks per month. It is a very busy industry and has many orders to fill. The bricks are sent mostly to Toronto, either by road or rail. The company has a large fleet of trucks. It is the source of income for the people of Milton Heights.

The Gypsum Lime and Alablastine Company of Canada Ltd. operated three lime kilns employing twenty men before it closed down in 1959 for reasons unknown. These kilns are located beside the C.P.R. at the base of the limestone escarpment at Milton Heights. It used to ship one car load of raw lime to Toronto every day.

Another large industry that has developed in recent years, using the limestone resources, is the quarrying of crushed stone. There are three large quarries at present. The Milton Crushed Stone Company has a very extensive operation on the side of the escarpment on Lot 1, and the 7th Concession., but is faced with the problem of lack of



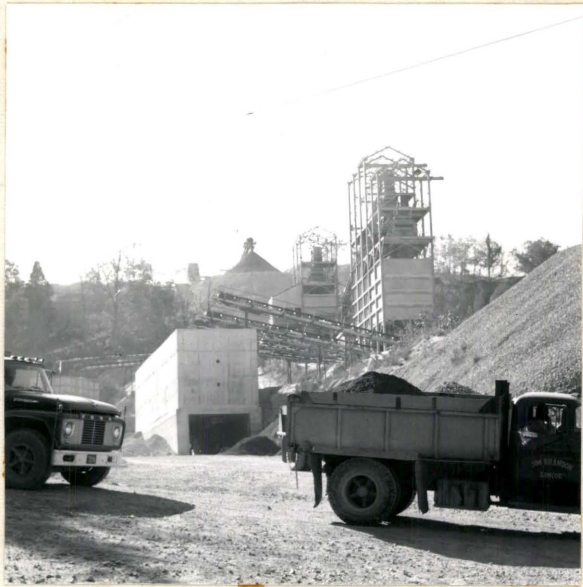


Fig. 53. The Milton Crushed Stone Company has a very large operation in the southeast corner of the township on the slopes of the Niagara escarpment.



Fig. 54. Canada Crushed Stone has a very extensive quarry and crushing operation on the limestone plain in Concession 6.

space to expand. The farmers in the adjoining lots are asking very high prices for their land. The Canada Crushed Stone Company has an equally extensive stone crushing operation on the limestone plain at Lot 8 in the 6th Concession. This operation has been set up on an abandoned farm and the company has purchased other surrounding idle areas for expansion.

Clover Leaf Quarries, also located on the limestone plain, Lot 8, Concession 4, seems to be inactive and may be closed down.

There are also a number of gravel pits in the township, found in spillway and kame deposits. These pits were very extensively worked during the construction of Highway 401 but do not appear to be used very much at present except for local supplies of sand and gravel. There is one pit in the Acton Spillway gravels at the Guelph Line and three pits in the Campbellville Spillway.

(f) Transportation.

The railway system of the township has been thoroughly covered in another chapter. It should suffice to say here that the railway has been more important in the past than in the present.

Today there are 37 miles of asphalt surfaced county roads, (the Guelph Line, and Number Five side road), and 80 miles of township gravel roads. Almost the entire township is traversed with closely spaced roads except for parts of the forested limestone plain. Two features have interrupted the road grid. The first is the bold face of the Niagara escarpment and the second is the recently built super high-

way. Some of the side roads have been cut and form dead ends at the highway but the more important roads pass under or over it.

Highway 401 which cuts diagonally across the southern part of the township is expected to bring a great change to the economy of the township, particularly in the Campbellville area which has the only access to the highway in the township. As we have already seen it is associated with the suburban development in that part of the township as well as the three million dollar race track which is coming soon.

This highway gives fast, easy connection with Toronto and points west. A major part of the production in the township goes to Toronto only 30 minutes away. It is possible that this highway may attract industry to the Campbellville area which the railway failed to do. I personally feel that Highway 401 will go a long way in opening up this backwoods township on the doorstep of the Golden Horseshoe.

To sum up, forested land of all types occupies the largest area of land, virtually one third of the township. The largest single agricultural use of land is for pasture which occupies another quarter of the total area. Hay crop is the largest single cultivated crop and the third largest user of land, 13%. Cultivated grain is fourth with 10%, and idle land is fifth with 5.6%. All other uses of land totalled 13.9%.

Thus we have a very large percentage of the land not being used for anything except forestry, mainly because of shallow overburden or poor drainage. A very large percentage of the remainder is given over to the support of livestock.



There are no large communities but suburban ribbon development appears to be creeping into the area. Industries are few and based on the geologic resources. The recreational industry is surprisingly extensive and growing rapidly. Highway 401 has undoubtedly played and will continue to play a significant role in all aspects of the township's development.

## PART IV

### CONCLUSIONS

The physical geography explains a great deal about the economy and land use characteristics of Nassagaweya Township. The sedimentary bedrock is of unusual economic importance, providing a source of clay, lime, crushed and cut stone. The few industries that exist are based on these geologic resources. The township demonstrates many features of the glacial history of Southern Ontario, including stagnant ice features, drumlins, moraine, spillways, limestone plain and a large re-entrant in the Niagara escarpment. The irregular and scattered agricultural land use patterns, and to a certain degree, the usefulness of the land, are a result of the local physiography shaped by the Wisconsin glacier. This has created agricultural handicaps such as the extensively stony land, shallow soils, imperfect drainage, and a rugged topography. The soils control, to a certain degree, the character and intensity of use. The majority belong to the Grey Brown Podzolic Great Soil Group. They are in general quite stony soils. The best ones are found on the drumlinized till and on level parts of the moraine. A great deal of the poorly drained land can be attributed to the youthful stage of stream development and the watershed characteristic of the region. This factor along with the limestone plain, explains the abundance of forest cover. The climax vegetation of sugar maple and related types, once associated with the best soils, has been cleared away except in the rougher areas, so that today

there is as much wet land forest type as there is climax vegetation. The pioneer forest type of aspen and paper birch, is also very extensive as a result of intensive commercial cutting over of the original forests. For these reasons, the vegetation types today correspond to the poor land conditions reflecting the nature of the soils and the physical character of the landscape. The forest, once of great commercial value has been exploited with no conservation measures undertaken. As a result, the once numerous white pine and rock elm have almost vanished. Moreover, in many cases, the land has been unwisely cleared, producing nothing more than rough stony pasture which is of poor economic use. For these reasons, reforestation is urgently needed to raise the commercial value of the forest, for soil conservation, and for flood control. The agricultural use of the land is well suited to the climate. The Niagara escarpment has only a slight influence on the climate and does not cause any differentiation in land use.

The historical geography explains the features of the present day land use and economy. The history of settlement had a significant influence on the pattern in which the township developed. This was in part directed by the early surveys and the routes of entry into the area. Being a "back" township it developed slightly later and to a lesser degree than its neighbours. The early villages were associated with the areas of earliest settlement, mostly along the Guelph Line. The process of clearing by fire resulted in the wasteful destruction of valuable forest resources. The opening of the grain lands of Western Canada and the growth of urban centres changed the face of the economy and



land use from cash grains to mixed farming with an emphasis on cattle, hogs, and dairying. The railways, in part, explain why certain urban centres declined and others didn't, but one also has to take into account the general improvements in transportation, the decrease in population, the rising standard of living and the introduction of the rural route delivery of mail. The most significant feature of Nassagaweya is the lack of large urban developments, hindered by the growth of adjacent large towns and cities, leaving it as a sort of "no man's land". This is explained by the lack of large streams in this headwater region to supply the fresh water and water power needed to fill the requirements of a large town and its industry.

The present land use of Nassagaweya is based on a livestock economy. Therefore, pasture and hay cultivation are the main uses to which the land is put. Although there is an emphasis on cattle and hogs, dairying is fairly important. Therefore, we can consider this area to be transitional between the General Farming Belt and the Western Dairy Belt. Farming, in general, is uneconomical in this backwoods area. Mechanization compared to other townships is not far advanced and farm field units are small and inefficient. As a result farm crops are very diversified to facilitate planting and harvesting. Hobby farmers and part-time farmers are playing an increasing role in the township's agriculture. This, and the spread of urban strip development are the result of an inefficient and frustrating farm economy. Fallow land in the township is directly associated with the distribution of part-time farmers. The spread of

cities and their suburban elements into the rich agricultural areas of the Golden Horseshoe may eventually result in the spread of specialized farming into Nassagaweya. On the other hand the increasing population upswing and the spread of strip urban development, indicates an influx of suburban dwellers into the township and an urgent need for planning. Recreation can be attributed to the backwoods location of the township which has resulted in clean, unspoiled forest and water resources. Highway 401 with an access route at Campbellville means a great deal to this township at a time when the truck and automobile are common place in transportation.

To sum up Nassagaweya in a nut shell, one must emphasize the backwoods situation of the township. This is attributed to its physical characteristics and location. It is a rugged, watershed region with a small population and inefficient farm economy. Overshadowed as it is by surrounding townships and urban centres, it is truly a watershed, economically as well as physically.

Having looked at Nassagaweya in both past and the present, it is only natural to wonder what the future may hold. What, if any, appear to be the developing trends in this area? As we have seen, there is every indication of an increasing population, mostly by suburbanites seeking low cost building sites on abandoned or idle farms. It is likely that this trend will continue and even increase. This will probably lead to an increase of part-time farmers as the land goes into suburban use and the farmers are drawn away by better paying occupations in the city.

It is possible that the desired creation of estate farms may develop. As we have seen, the conditions and qualifications are excellent.

A steady growth of Campbellville from a police village to a suburban town is assured, prompted by the access to Highway 401 and the business and industrial possibilities that may come with it. We have already seen a start in the building of a three million dollar race track. It is possible that Sodom, being favorably located on the Guelph Line may share in this growth. Eden Mills, Moffat, Guelph Junction and Kelso should see no changes in the future, but Milton Heights, being a suburb of Milton should continue to grow.

It also seems inevitable that there will be an increase in specialized agriculture and a decrease in general farming as the demands of the urban complex in the Golden Horseshoe reach Nassagaweya. This area appears particularly promising for dairying and perhaps dwarf fruit orchards?

There will be an increase in reforestation encouraged and administered by the very active conservation authorities in this area.

Recreational aspects look very good. Expansion will be rapid with the growth of the Kelso Dam Project and the racing industry. Large areas along the escarpment could be turned into nature trails. The forests and streams, if properly supervised by Wild Life Officials should provide a great deal of recreation for sportsmen.

There is very little hope of industrial growth in this area. However, the clay and crushed stone operations should continue to prosper. There is a large area of lime-



stone plain that is very accessible and cheap for the expansion of the stone crushing industry.

This is what the future may hold for Nassagaweya. With proper planning and administration there is every indication that there will be better days ahead.

APPENDIX "A"

FARM CENSUS MATERIAL

Total Area - 46,080 Acres

	POPULATIONS							OCCUPIERS OF LAND			FARM AREA OCCUPIED LAND			CONDITIONS OF OCCUPIED LAND					
	TOTAL	ON		TOTAL	OWNERS	TENANTS	PART OWNERS	TOTAL	OWNED	RENTED	IMPROVED			UNIMPROVED					
		FARMS	NOT ON FARMS								CROPS	FALLOW	PASTURE	TOTAL	WOOD-LAND	NATURAL PASTURE	MARSH OR WASTE		
1961	2,345												3,362	4,044		1,427	6,719	2,000	
1956	2,261	1,629	632	284	244	16	14	38,097	34,309	3,788	20,947	12,839	1,165	5,910	17,150	8,431		8,719	
1951	1,970	1,234	736	303	253	21	22	39,414	34,846	4,568	22,142	13,816	1,142	6,062	17,272	9,140		8,132	
1941	1,867	1,214	653	348	281	43	19	42,557	36,062	6,495	22,690	16,121	664	4,845	19,867	8,122	9,806	1,939	
1931	1,938	1,331	607	358	305	35	18	42,872	36,087	6,785	23,044	17,766	837	3,914	19,828	9,535	8,467	1,826	
1921	2,133			361	284	63	14	40,482	32,706	7,776	23,770	17,742	1,685	3,299	16,712	7,551	7,911	1,250	
1911	2,357			379	302	63	14	42,316	35,710	6,606	25,204	19,041	761	3,200	17,112	7,547	5,957	3,908	
1901																			
1891	2,809			470	375	95		42,150			31,194	23,813		6,608				10,956	
1881	2,800			397	302	94		39,601			21,822	15,937		5,236					
1871	2,964			396	318	77		40,472			23,719	15,910		3,600					
1861	2,800							36,402			19,943	10,978		4,300					
1851	2,237										16,335	6,012		5,000					

APPENDIX "B"

LIVESTOCK ON FARMS

AREA OF FIELD CROPS

	CATTLE					CHICKENS				ALL CROP	WHEAT	BARLEY	OATS	RYE	MIXED GRAIN	CULTIVATED HAY	OTHER FODDER	POTA-TOES	ROOT CROPS	TURNIP	OTHER FIELD CROP	CORN ENSILAGE	
	HORSES	TOTAL	MILK	BEEF	OTHER	SHEEP	SWINE	HENS	OTHERS														
1961											1,248		2,600		6,048								1,000
1956	250	5,077	1,881	1,003	2,196	754	2,756	13,712	48,213	12,839	1,644	63	2,687	84	1,192	5,525	318	48	100	400			561
1951	501	4,214	2,108	752	1,354	485	2,870	13,378	51,696	13,636	2,108	84	3,738	45	1,440	5,481	582	83	71			4	
1941	991	4,900	2,431	397	2,072	1,346	3,521	38,532	2,184	16,107	1,707	621	3,576	15	3,109	5,946	519	248	100	246	13		
1931	1,031		1,959		2,739	1,763	2,779	29,568	2,000	17,560	1,235	866	4,716		3,016	5,998		320	110	400			
1921										17,742	2,115	753	5,843	132	1,766	5,767	52	323	115	404	121		759
1911											2,988	707	5,878	24	1,088	4,914	270	288	307	323			651
1901																							
1891	1,168		1,524		2,694	2,240	2,684	13,293			3,719	1,224	3,973			4,124		361				599	
1881											4,322					3,579		368					
1871											3,343					4,486		382					
1861	672		1,137	517		3,242	1,721				4,441	175	1,509	1	1,266	TONS 22.38		326		364		6	
1851	602		1,129			3,863	1,909				3,203	54	1,484	4	668	TONS 61.34		230		117		17	



APPENDIX "C"

DAILY MEAN TEMPERATURES

Stn.	Years Observed	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Guelph:	44	20	18	29	42	54	63	68	66	59	48	36	24
Georgetown:	33	20	20	28	41	53	62	68	66	59	47	36	24

ANNUAL PRECIPITATION IN INCHES

Stn.	Years Observed	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Guelph:	44	2.39	1.74	1.79	2.38	2.72	2.8	3.07	2.86	2.5	2.39	2.44	2.14	29.26"
Georgetown:	62	2.59	2.38	2.64	2.18	2.84	2.72	3.03	2.63	2.5	2.54	2.64	2.49	31.48"

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