

B A Y H A M    T O W N S H I P

By

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A Thesis

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*F. G. Reeds.*

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## P R E F A C E

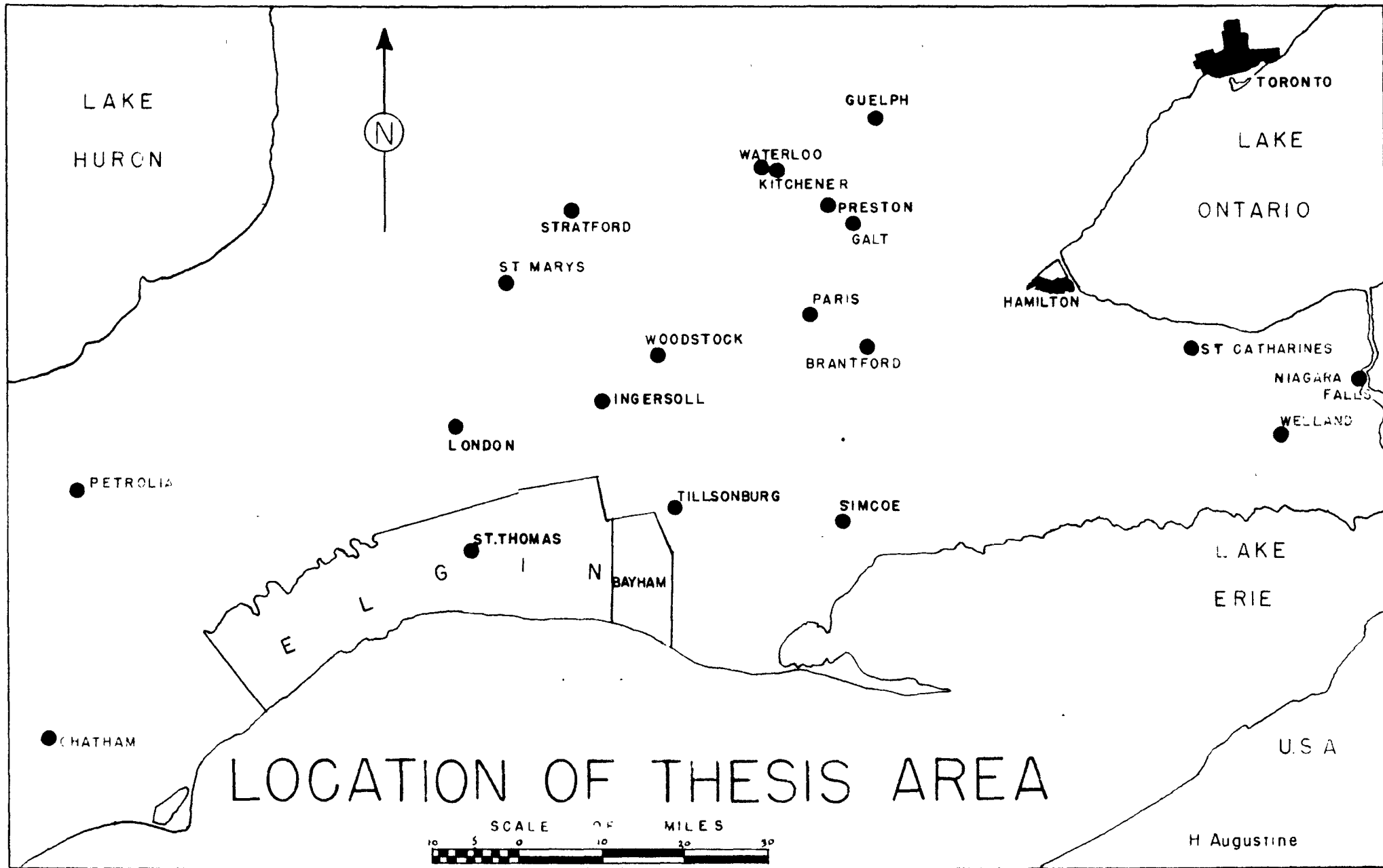
Bayham township is situated in Elgin County in southwestern Ontario. Its position is shown on Map I. The township is somewhat rectangular in shape extending up to fourteen miles from the north shore of Lake Erie and being 7.2 miles in width.

Map II is the key map of Bayham township. The concession roads and main highways are located and it can be seen that Provincial Highway #19 and the Canadian Pacific Railway are the chief transportation routes of the area. The Talbot road running east and west and also the lakeshore roads are important only as local routes. Many east-west routes are incomplete, being interrupted by the valley of the Otter Creek. Highway #3 and the Canadian National Railway run through the extreme northern section of the township.

The urban areas are shown on Map II. It can be observed that the urban centres are small and few.

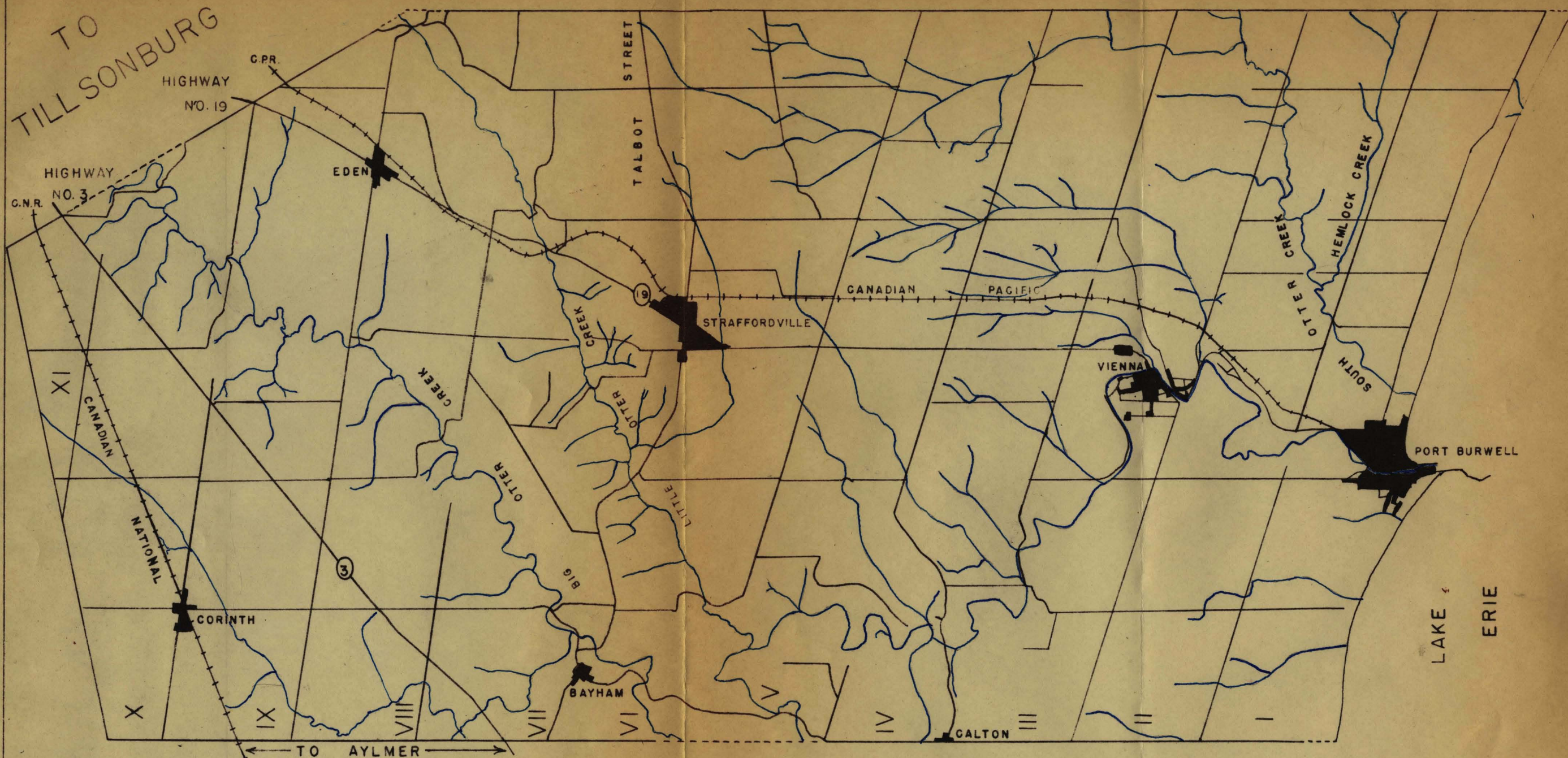
This thesis is essentially a land use study of Bayham township on a regional basis, an attempt being made to show how rural and urban land uses are influenced by both physical and cultural factors.

The study is divided into three chapters. In the first chapter the physical geography is discussed. Chapter 2 traces the evolution of the agricultural and urban development. Present land use both agricultural and urban are discussed in Chapter 3. A conclusion and appendix complete the thesis.

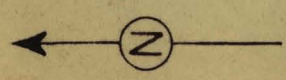




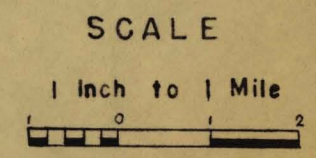
TO  
TILLSONBURG



# KEY MAP OF BAYHAM TOWNSHIP



- ROAD
- - - RAILROAD
- IX CONCESSION NUMBER
- STREAM
- URBAN





# C H A P T E R I

## PHYSICAL GEOGRAPHY OF BAYHAM TOWNSHIP

### Geology

#### Bedrock Geology

Bayham township is located in the Ontario Lowlands and is underlain by gently undulating Palaeozoic limestones of the Delaware and Detroit River - Onondaga Oriskany formations.

Dipping gradually to the southwest these limestone formations are overlain by a thick layer of drift reaching a depth of 250 feet at Port Burwell. Because of their great depth beneath the surface these rocks have affected the present day physiography and soil pattern very little. The only effect that can be noticed is that some of the artesian waters are sulphurous, especially those coming from the Delaware rocks, and may be unfit for human consumption, although quite suitable for stockwatering, certain industrial purposes and even irrigation.

#### Geomorphology

Four ice sheets advanced and retreated over Bayham township. The Wisconsin, last of the great glaciers to move over the township in the Pleistocene Epoch, affected the present day physiography to the greatest extent. This glacier halted near Tillsonburg for a time, long enough to build a moraine. This moraine called the Tillsonburg moraine, is made up of fine

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1. Chapman, L. J. and Putnam, D. F., The Physiography of Southern Ontario, 1951.

materials mainly sands, silts and clays. The moraine is very low and gently sloping and because it is practically buried by lake deposits, it is not easily observed.

Meltwater from the retreating glacier created large lakes south of the ice front. Lake Whittlesey covering the southern half of the Huron basin and the Erie basin, was formed when the glacier halted near Tillsonburg. Beds of sand, silt and clay were laid down in this lake partly burying the Tillsonburg moraines. The shoreline of Lake Whittlesey found near the 800-foot contour can be seen on Map III.

Later, after a short retreat of the ice sheet, another lake called Lake Warren was formed. This lake stood 60 feet below the level of Lake Whittlesey and extended farther to the east into the western part of the Ontario basin. The beaches of this lake are found near the 750-foot level as seen on Map III. Two parallel beaches are found here, the southern one being ten feet lower may have been formed by Lake Lundy which followed Lake Warren. During the life of Lake Warren a great deal of sand was deposited in Bayham by meltwater streams burying much of the deltaic and clay material formerly deposited in Lake Whittlesey. The deltas built into Lake Whittlesey and Lake Warren by meltwater rivers are known as the Norfolk sands.

There are many dunes found in the Norfolk sands, most of

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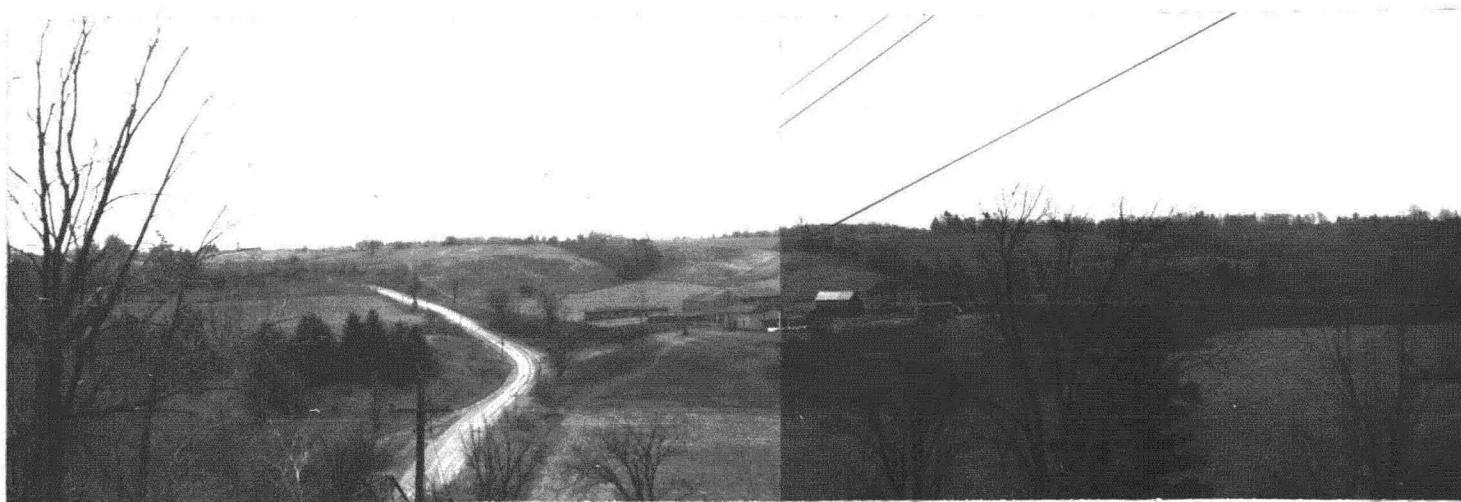
1. Chapman, L. J. and Putnam, D. F., The Physiography of Southern Ontario, 1951.

which were formed by wind action in the period of Lakes Whittlesey and Warren. Many of the smaller dunes have developed by wind action, particularly since the land has been cleared.

As the ice gradually melted, a lower outlet was uncovered for the lake. Lake Warren subsided and divided into two parts: Lake Algonquin and Lake Lundy. Lake Lundy lay in the basin now occupied by Lake Erie and western Lake Ontario. As the ice retreated most of the Erie basin was drained almost dry, the water escaping over the Rome divide. This little lake Erie drained via Niagara Falls. This small lake produced a base level for the streams which was lower than the present base level. The streams therefore were cut to greater depths near their mouths than they are at present.

Tilting of the earth's crust brought about an uplift of the north and east relative to the south and west. Lake Huron overflowed into Lake Erie because of this tilting and as a result Lake Erie grew to its present size.

Stream erosion has been the chief factor in developing the present topography. The Otter Creek is a stream in very early maturity and is chronologically much younger than streams farther west. This is due to the tilting effect of the earth's crust. The stream has cut downward very rapidly because of the soft and erodible nature of the overburden; the banks are quite steep and the valley in many places exceeds 100 feet in depth. Near the mouth of the stream the valley is



River dissection by the Otter Creek at the village of Bayham. The Lake Warren sand cap was eroded leaving the Lake Whittlesey clay terrace. Note the corn fields on the bottom land.



somewhat wider with the same steep walls and a flat floor. The stream here was at one time more deeply entrenched but with the rising of the lake, the valley floor has been silted in with sands and silts eroded from areas farther north.

Erosion of the sand cap by sheet wash and stream action has exposed an area of Lake Whittlesey clay near the town of Bayham and clay terraces in the morainic area.

Alluvial dissection though not yet far advanced is proceeding rapidly. Active gullies are found along the Otter Creek and its tributaries and along the lake shore. In some cases these gullies move very quickly and will sometimes create a gorge 100 feet deep and a quarter of a mile long in twenty to thirty years. The rate of erosion has been increased since settlement of the area as a result of the agricultural and forestry methods employed.

The lake is also acting as an erosional agent attacking the shore and eroding it back at an average rate of 6.37 feet per year. The annual loss in <sup>1</sup>acorage is 6.04 acres. The southwest winds which dominate this region are the chief cause of the destruction of the bluff, giving rise both to wind action against the bluff and, more important, to waves which erode away the base of the bluff. The breakwater at Port Burwell interrupts the general easterly march of materials along

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1. Wood, H. A., Erosion on the Shores of Lake Erie, May, 1951.



Rapidly eroding cliffs east of Port Burwell. Bluffs are composed of lacustrine clay and medium sand. Note the less resistant sand cap eroded more quickly than the clay layers.








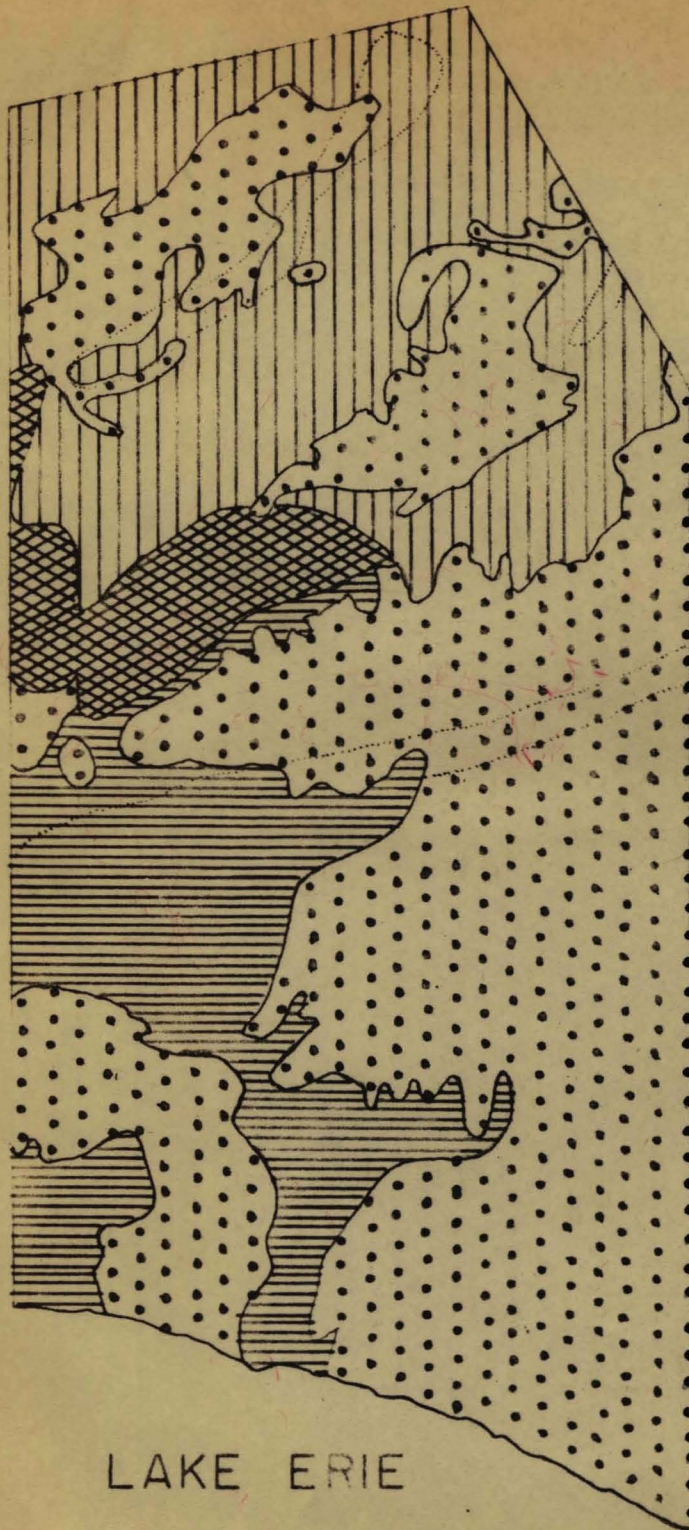
Bluff composed of silt and silty clay west of Port Burwell.

# BAYHAM TOWNSHIP

## PHYSIOGRAPHY

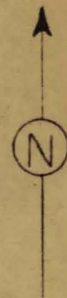
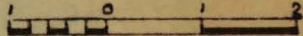
### LEGEND

-  SAND PLAIN
-  CLAY PLAIN
-  TILL MORAINE
-  COMPLEX OF  
CLAYS TILLS  
AND ERODED  
MATERIALS
-  SHORELINES



### SCALE

1/2 Inch to 1 Mile



LAKE ERIE

the shore and in consequence a broad beach has built up west of the breakwater. To the east, on the other hand, because of the poverty of beach materials the rate of shore recession reaches a maximum of ten feet per year. The bluffs of Bayham are approximately 100 feet high at both eastern and western extremities of the township. In the vicinity of Port Burwell they rise to only thirty to forty feet. The base of the bluff where it is composed of till or clay has a slope exceeding  $70^{\circ}$ . Above this where materials are less compact, slopes are much lower, generally between  $30^{\circ}$  and  $40^{\circ}$ .<sup>1</sup>

In conjunction with the above information four physiographic regions were recognized in Bayham township. This regional subdivision is based partly on published material and partly on field work carried out by the writer. These regions are shown on Map III.<sup>2</sup>

### Climate

In its broad setting Bayham township lies in a climatic region which Köppen has designated as humid microthermal with cold winters and warm summers and precipitation well distributed throughout the year. (Dfb).

Another classification by Jones and Whittlesey places this

- 
1. Wood, H. A., Erosion on the Shores of Lake Erie, May, 1951.
  2. Chapman, L. J. and Putnam, D. F., The Physiography of Southern Ontario, 1951.
  3. Soils Map of Ontario Soil Survey.

area in a humid, continental type climate.

A more detailed examination of the climate in this area has been made by Chapman and Putnam.<sup>1</sup> Bayham is included in their climatic zone known as the Lake Erie Counties. The influence of the lake to the south tends to reduce the daily temperature range. Situated at 42°N Latitude, Bayham township lies within an area which is directly in the path of the strongest westerly winds and the majority of the cyclonic storms which cross the continent from west to east. This region is characterized by a modified climate although it is noted for its extreme changeability.

The following is data compiled from the Lake Erie Counties:

Mean Annual Temperature	46° F
Mean Winter Temperature	23° F
Mean Spring Temperature	43° F
Mean Summer Temperature	67° F
Mean Fall Temperature	49° F
Average Date of Last Frost in Spring	May 10
Average Date of First Frost in Fall	October 10
Length of Growing Season	203 days
Average Length of Frost-Free Period	153 days
Average Annual Precipitation	33.8"

A brief description of the climatic data obtained from the Tobacco Experimental Sub-Station a few miles east of Bayham will give some idea of the climatic conditions affecting the area.

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1. Chapman, L. J. and Putnam, D. F., The Climate of Southern Ontario (Sc. Agr. 1938).



Bayham township has an average mean annual precipitation of 39.03 inches, which is quite uniform throughout the year. The winter snowfall averages 60 inches, providing a moderate to heavy runoff in the spring. This runoff although not as heavy as in Northern Ontario causes a great deal of erosion in the light textured soils of the Norfolk Sand Plain.

The average temperature in Bayham township varies from a mean minimum of 23.09°F in January to a mean maximum of 70.11°F in July. Great variations occur within this range, the temperature often going down to -18° in January and February and up to 95° in July. The mean average monthly temperatures computed from the figures covering the period 1935 - 1957 are as follows:

Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
23.09	24.13	32.26	43.57	54.95	65.76	70.11	68.95	66.53	50.50	33.31	27.50

Therefore, it can be seen that the winters are relatively mild and the summer temperatures are sufficient to produce a high thermal efficiency which allows the farmers in this area to grow a great variety of crops.

The frost-free period in Bayham township varies from 108 to 169 days with an average of 138 days. The date of the last spring frost and, especially, that of the first fall frost, are of great importance to the tobacco farmers. The last frost in the spring ranges from April 29 until May 26. In the fall the first frost may occur as early as September 12 or as late as October 17. The average dates for the

last frost in the spring is May 15 and the average date for the first frost in the fall is September 28. This information is based upon records for the period from 1934 to 1957, but many farmers in Bayham have claimed that frost has killed their new plants on June 16 and their tobacco as early as August 24. Most tobacco farmers agree that it is unwise to plant the tobacco before May 24 and to count on having frost-free days after September 22.

Wind plays an important part in the climate of Bayham township. Because the soils in the Norfolk Sand Plain area are light, they tend to be eroded easily by the wind. The Plainfield sand is especially subject to this type of erosion. Early settlers not realizing this, stripped their land of vegetation allowing the wind to create dunes and destroy many acres of land.

In order to understand more precisely the affect upon the township of its climate reference may be made to the Thornthwaite classification which involves quantitative measurements of precipitation effectiveness, temperature efficiency and seasonal distribution of effective precipitation distribution. Using this method of calculating the potential evapotranspiration, the actual moisture deficit and storage can be calculated.<sup>1</sup> The type of climate which was found using this method is a climate which is a humid mesothermal climate with a very small water deficiency and a summer concentration of 59.8%.

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1. A discussion of the Thornthwaite system, its calculations and applications to Bayham township are found in Appendix "A".

Natural Vegetation

Bayham township lies entirely within Hallidays Deciduous Forest Region.<sup>1</sup> The forest here consists primarily of beech and sugar maple together with basswood; red maple; red, white and bur oak; while a large number of other species, many of small size, find their northern limit here. Among these are chestnut, tulip, pignut hickory; black, pin, chinquapin and chestnut oaks; black gum, blue ash, red mulberry, magnolia, papaw, Kentucky coffee, red bud, sassafras, black walnut, sycamore, swamp white oak and shagbark hickory. Coniferous species are lacking except for white pine which is abundant on the lighter soils.

The forest cover of Bayham township has been greatly reduced from that found by the early settlers. The surveyors in 1815 found pine, oak and chestnut to be most common with frequent occurrence of sassafras, hazel bushes and dogwood on the sand plains while sycamore was common in the valleys.

The present forest cover was surveyed by the Department of Planning and Development in 1955. The following figures represent the distribution of various stands of trees:

Beech - Sugar maple	30%
White Pine - Hemlock	9%
Hemlock	8%
Aspen	9%
Sugar Maple - Beech - Yellow Birch	7%

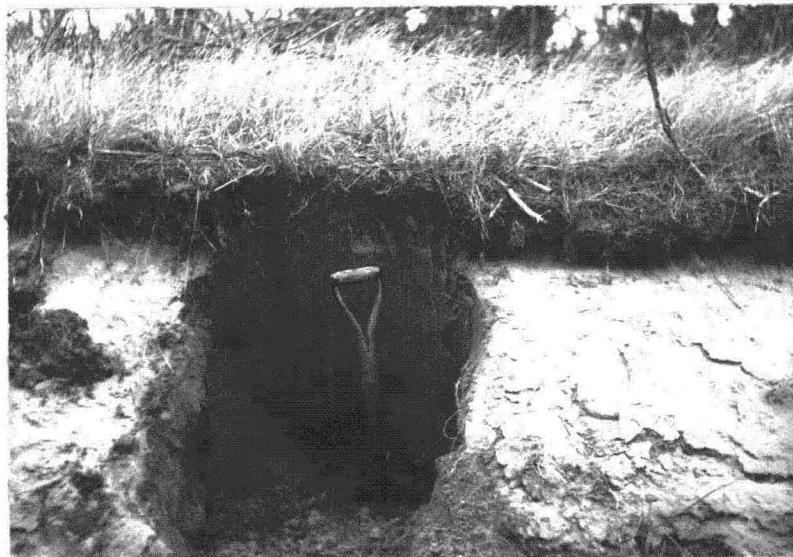
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1. Halliday, W.E.D., A Forest Classification for Canada Bulletin 89, Forest Service.





Reforested Sand Dunes



The Plainfield Sand showing A and C Horizons.  
Note the grey sand in the lower C horizon.

(Cont'd) Sugar Maple	16%
White Elm	6%
Silver Maple - White Elm	7%
Small stands of several types of trees	16%

Most of this cover is 4" - 18" in diameter, unfenced and ungrazed.

The writer during his field work noticed that several species of Halliday's Deciduous Forest were absent. Chestnut, tulip, pignut hickory, red mulberry, magnolia, papaw and Kentucky coffee were not observed. The several species of oak are only found occasionally. Pine is restricted to small woodlots and reforested areas.

Scrubland in Bayham is not included in the above table and accounts for 1.6% of the land or 896 acres.

Windbreaks and small plantations consisting mainly of pine trees are found scattered through the sandy areas. Many of the trees are planted on sand dunes and aid in the reduction of wind erosion. Other stands are planted for Christmas tree and timber production.

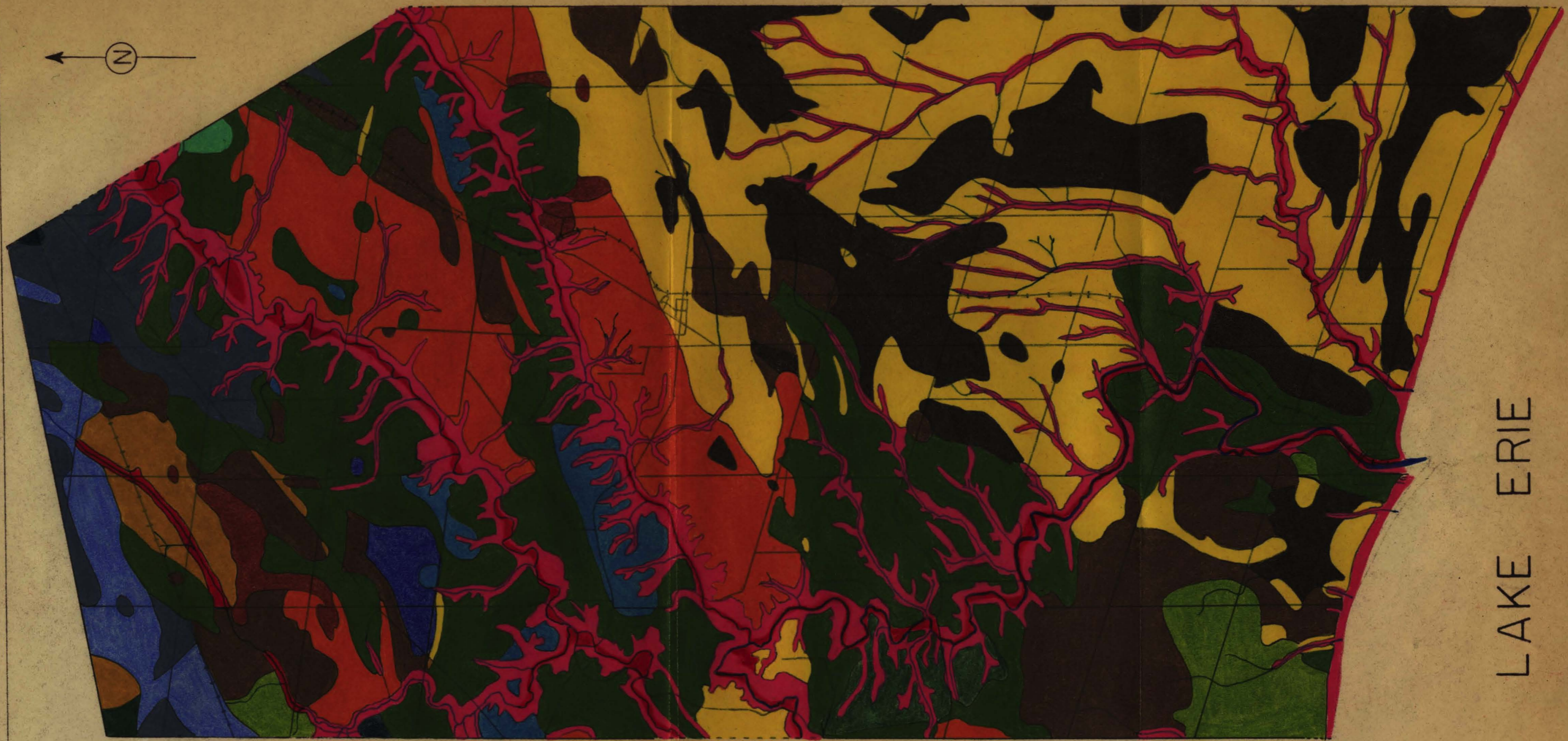
### Soils

Bayham township lies in the Grey-Brown Podzolic Zone of North America. The soils found in the study area have mainly been developed on deltaic and moraine material. The soil survey shows eighteen soil types in the township. These are shown on Map IV. These soil types

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1. O.A.C. Soils Map.



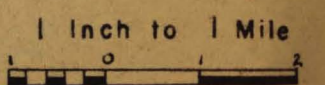


## SOIL MAP OF BAYHAM TOWNSHIP

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| <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; border: 1px solid black; margin-right: 5px;"></span> PLAINFIELD SAND</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: red; border: 1px solid black; margin-right: 5px;"></span> OSHTEMO LOAMY SAND</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: brown; border: 1px solid black; margin-right: 5px;"></span> BERRIEN LOAMY SAND</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: darkbrown; border: 1px solid black; margin-right: 5px;"></span> BROOKSTON SANDY LOAM</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: black; border: 1px solid black; margin-right: 5px;"></span> WATRIN SAND</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: darkred; border: 1px solid black; margin-right: 5px;"></span> GRANBY SAND</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: green; border: 1px solid black; margin-right: 5px;"></span> MIAMI LOAM</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: black; border: 1px solid black; margin-right: 5px;"></span> MIAMI GRAVELLY LOAM</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: green; border: 1px solid black; margin-right: 5px;"></span> FOX GRAVELLY LOAM</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: darkgreen; border: 1px solid black; margin-right: 5px;"></span> MIXED SAND &amp; SILTY LOAM</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; border: 1px solid black; margin-right: 5px;"></span> BEVERLEY SILT LOAM</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: black; border: 1px solid black; margin-right: 5px;"></span> CLYDE LOAM</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: darkblue; border: 1px solid black; margin-right: 5px;"></span> MIAMI CLAY LOAM</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: blue; border: 1px solid black; margin-right: 5px;"></span> HALDIMAND CLAY</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: blue; border: 1px solid black; margin-right: 5px;"></span> CONOVER CLAY LOAM</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: darkblue; border: 1px solid black; margin-right: 5px;"></span> BROOKSTON CLAY</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: darkred; border: 1px solid black; margin-right: 5px;"></span> BOTTOM LAND</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: pink; border: 1px solid black; margin-right: 5px;"></span> ERODED STREAMS</li> </ul> |
|---|--|---|

LAKE ERIE

SCALE



H. Augustine

(AFTER O.A.C. SOIL MAP)



can be grouped under three general headings, (a) the sands and sand loams (b) the loams and silty loams and (c) the clay loams and clays.

#### The Sands and Sandy Loams

Covering an area of over one-half of the township, the sands and sand loams occupy the entire southeast section of the township and include two large areas in the northern section. For most of the sands and sandy loams the parent material is a well sorted, coarse textured outwash sand. The inherent fertility of the sand is low. Organic content is particularly low and the nutrients leach out quickly.

In some areas the sand is overlying a clay layer which acts as an impermeable layer and produces a fairly high water table. The sands here may be poorly drained. In most areas the sand layer is quite deep giving rise to rapid infiltration of precipitation and also a good movement of ground waters.

The Plainfield sand is the most extensive type in this group. It is a flat plain found on the southeast corner of the township.

The Plainfield sand exhibits the characteristics of an azonal soil. Only occasionally is there a faint trace of a B horizon.

The profile consists of:

- A<sub>c</sub> - 3-4 inches of yellow grey sand; low in organic matter; single grain structure; stonefree; pH6.0
- C - Light yellow sand grading into grey sand; single grain structure; grey sand usually calcareous; stonefree; pH of upper part of horizon about 6.0; occasionally heavier textured materials may occur at depths of 5 to 6 feet

Because of the excessive drainage and lack of organic matter this soil is easily eroded by the wind and many dunes have been created which cannot be cultivated with any degree of success and must be reforested to prevent further blowing.

The Granby sand is found in the northwest part of the township and comprises only a small area. Several small areas of this sand are also found west of Straffordville.

The profile consists of:

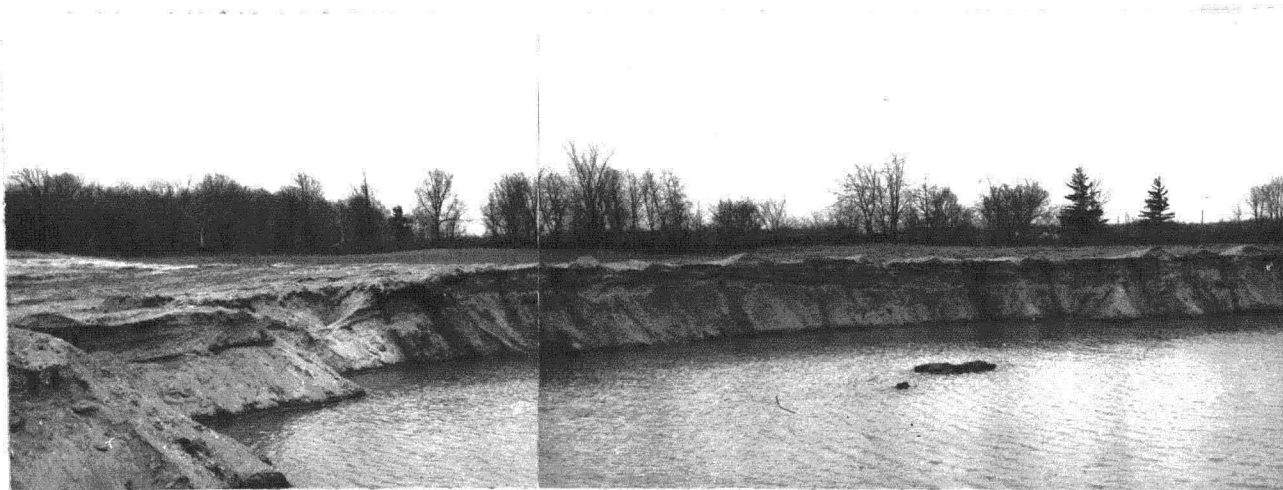
- A<sub>c</sub> - 6 inches of very dark brown sandy loam; high in organic matter; fine crumb structure; very friable consistency; pH6.8
- G - 30 inches of grey sand; occasional rusty coloured mottles; structure poorly defined, usually single grain; stonefree; pH7.0
- C - Grey calcareous stonefree sand pH7.6

The Oshtemo sandy loam has recently been classified under the Fox series, being quite similar to the Fox sandy loam.<sup>1</sup>

This soil type is found in the northern and eastern sections of the sand area and is second largest in this group of soils. The Oshtemo sandy loam occurs in areas topographically similar to those of Plainfield sand, but the profiles of the two soil types are quite different.

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1. O.A.C. Soils Map.



Deltaic sands laid down over till moraine in Sand Plain region. Note the high water table resulting from the clay layer found at a depth of ten to fifteen feet. Note idle land.

Oshtemo sandy loam consists of:

A<sub>c</sub> - 5-7 inches - cultivated area, dark brown sandy loam.  
pH-6.0

A<sub>2</sub> - 16-24 inches - yellowish brown stonefree sand layer.  
pH-5.8

B - 2-6 inches - compact reddish-brown loam layer.

Berrien loamy sand is located in a pocket in the northern part of the sand plain. The soil is imperfectly drained with poorly defined horizons and is different from the Plainfield and Oshtemo sands in that there is mottling in the lower A<sub>2</sub> and B horizons. The most striking feature is the heavy calcareous clay till found at a depth of three to six feet accounting for the poor drainage. It is low in organic matter and quite acid, having a pH of 6.0 to 6.5.

Profile for Berrien loamy sand:

A<sub>c</sub> - 4-6 inches of grey brown sand or sandy loam weak fine crumb structure, stonefree pH-6.0 - 6.5

A<sub>2</sub> - 12 - 24 inches of yellow brown sand or sandy loam, colour becomes paler yellow with depth; usually contrasting mottlings in lower part of horizon; stonefree; pH-5.8

B - 18 - 24 inches of mottled yellow grey sandy loam; few to numerous rusty brown concentrations, stonefree pH 6.5

C - Grey calcareous sand; stonefree; usually contains a small amount of free carbonates; pH-7.4

D - Heavy calcareous clay till at 3 to 6 feet

The Brookston sandy loam is poorly drained. It is similar to the Berrien loamy sand in that it overlies clay. It is low in organic matter and with medium acidity.

Profile for Brookston sandy loam:

- A<sub>c</sub> - 8 inches of black sandy loam, fine crumb structure; high in organic matter, stonefree; pH-7.0
- G - 20 - 40 inches of yellow and orange sandy loam with occasional thin strata of clay; pale yellow, low contrast mottling; stonefree; pH-7.2
- C - Grey calcareous sand, stonefree; pH-7.2 - 7.4
- D - Heavy calcareous clay, occurs at depths of 3 to 6 feet

The Watrin sand in almost all cases is surrounded by Plainfield sand. This area is of mixed sands including areas of Granby sand and Berrien sand. It is low in organic matter and strongly acid. The subsoil is usually watersoaked.

#### The Loams and Silty Loams

The Miami loam and Miami gravelly loams are both well drained, slightly acid and low in organic matter. The area covered in Bayham township by these soils is very small, comprising only a few acres near the Otter Creek. Another small area, the Fox gravelly loam is the well drained member of the Fox Series with a gravelly subsoil.

The mixed sand and silty loam type is made up of Ottawa sand and Miami silty clay loam. This soil type comprises a great deal of land near the Otter Creek and its tributaries. The texture



of the soil varies throughout the area. In the sand plain areas near Eden the material is mainly sandy being somewhat similar to the Oshtemo loamy sand. In the Vienna and Port Burwell areas the soil contains a large percentage of clay and silt. Erosion, mainly of the sheet variety has removed the sand in various sections leaving the till and lacustrine clay exposed. This entire area is fairly well drained.

The Beverley silt loam, an imperfectly drained soil occurring in the southwest corner of the township, is very flat, being underlain by a layer of clay at a depth of 4 - 10 feet. The fertility is good and soil is neutral.

Profile for Beverley silt loam:

- A - 8 - 10 inches of dark grey to black silt loam.  
   <sup>c</sup> High in organic matter; pH-7.0
- G - 24 - 30 inches heavy grey silt with yellow and orange brown mottles; pH-7.0
- C - 4 - 10 feet grey calcareous heavy clay; pH-7.6

Clyde loam is found in only a few acres in the northwest corner of the township in the till moraine regions. It is a poorly drained black loam, high in organic matter and underlain by clay. The soil is neutral to alkaline with good fertility.

#### Clay and Clay Loam

These soil types are found in the north of the township and in a small area near Bayham. This area is mainly included in the till moraine and clay plain regions.

In the north the well drained Miami clay loam and imperfectly drained Conover clay loam comprise the uppermost part of the Tillsonburg moraine. These soils are low in organic matter and quite acid with a pH of 6.0 - 6.5.

Profile for the Conover Clay Loam:

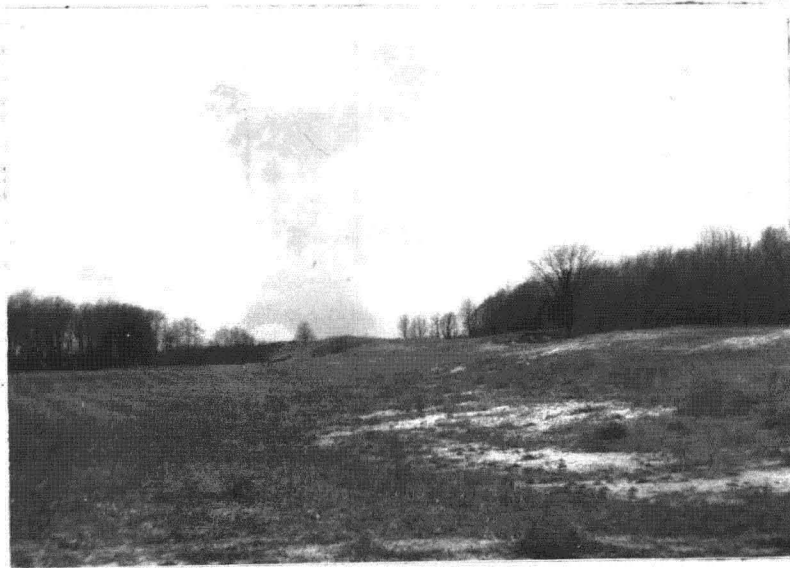
- A<sub>c</sub> - 6 inches of dark grey clay loam pH-6.5
- A<sub>2</sub> - 10 inches mottled yellow brown clay loam medium structure; pH-6.5
- B - Grey calcareous heavy clay till some brown mottles: pH-7.4

Profile for the Miami Clay Loam:

- A<sub>c</sub> - 4 - 6 inches clay loam, dark grey; pH-6.8
- A<sub>2</sub> - 6 - 10 inches clay loam, light brown
- B - 5 - 8 inches clay, dark yellowish brown
- C - Clay layer; grey brown in colour

North of the town of Bayham is found an area of poorly drained Brookston clay. It is one of the dark grey Gleisolic soils, with a fairly high organic matter content in the surface soil. The profile of the Brookston clay consists of:

- A<sub>c</sub> - 6 - 8 inches dark grey brown clay, medium granular structure; almost stonefree; pH-6.8
- GA<sub>2</sub> - 6 inches of grey drab clay with yellow brown mottlings; fine to medium nuciform structure; pH-6.8
- G<sub>1</sub> - 18 inches of grey clay with yellow brown mottling; coarse blocky structure; pH-7.0



Sand Dunes in Plainfield Sand. Developed after land clearance. Note idle land.



Vienna Land Type. Note corn growing on Lake Whittlesey clay terrace.

- G<sub>2</sub> - 6 - 8 inches of grey to light grey clay; mottling less intense than in G<sub>1</sub>; very coarse blocky to massive structure; pH-7.2
- C - Heavy calcareous clay till; grey to light grey in colour, gritty

South of the Brookston clay area and in four areas near the Otter Creek is found the well drained, Haldimand clay. This soil type is low in organic matter and very acid with a pH of 5.0 to 6.0. The surface soil is a light greyish-brown clay or clay loam about 5 or 6 inches thick. This grey colour is a result of the low organic matter content. The A<sub>2</sub> layer is 2 to 4 inches of yellowish grey clay with a fairly high percentage of silt. The B layer 8 to 10 inches thick is composed of a heavy, reddish-brown clay. The parent material is lake Whittlesey clay.

Bordering the stream courses are the azonal soils known as bottom land. Flooding each year has produced a complex soil type, with no developed profile and a variable composition of sand, silt, clay or gravel. The drainage is imperfect to poor.

### Land Types

Land type units are areas which have similar soils, topography and drainage conditions. These units based on physical features are helpful in describing the study area and also provide a basis for the correlation of agricultural, economic and social data. On the basis of the above criteria, Bayham township has been divided into five land types.

# BAYHAM TOWNSHIP

## LAND TYPES

### LEGEND

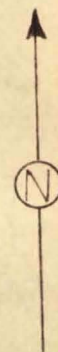
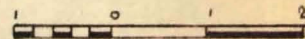
-  CORINTH
-  STRAFFORDVILLE
-  HALDIMAND
-  BEVERLEY
-  VIENNA



LAKE ERIE

### SCALE

1/2 Inch to 1 Mile



### The Straffordville Land Type

The characteristic feature of this land type is the sandy soil, good drainage and flat relief.

The Straffordville land type is the most extensive type recognized in the region comprising approximately 33,000 acres. It comprises a large area in the south and east half of the township and two large areas in the northern part of the township. The overall topography is a flat plain with elevations running from 650 feet near the lake to 750 feet in the northern part of the township. Gullies are found near the creek and its tributaries and also along the Lake Erie shore.

The soils in this land type are the sands and sandy loams. Because of the open texture most of the sands are well drained except those which have a clay layer close to the surface.

### The Vienna Land Type

The characteristic feature of this land type is the mixed type of soil and the great degree of dissection.

The Vienna land type is second to the Straffordville in extent and covers approximately 19,000 acres. It occurs near the Otter Creek and extends from Port Burwell in the south to within a mile of the most northern boundary of the township. This land type is almost entirely composed of the Ottawa sand and Miami silty clay loam soil type. Several small pockets of loam appear but comprise



Straffordville Land Type

a very small area. Because this land type is composed of sands, silts and clays and is close to the creek, the dissection is very great. Most of the soils are developed on old till material with the upper lacustrine layer eroded away. In the north a greater percentage of the material is sand.

In most cases the drainage is very good. The elevation will vary considerably from 600 feet at Port Burwell to 800 feet near the northern boundary.

#### Corinth Land Type

The characteristic and differing features are based entirely upon the soils.

The Corinth land type is found on the northern edge of the township covering approximately 2,000 acres. The area is level to gently sloping with elevations of 775 to 800 feet. The soils are clay loams, of which the sloping areas have the better drainage. The relief and drainage of the Corinth land type are quite similar to those of the Straffordville land type immediately south.

#### The Haldimand Land Type

Clay soils combined with rough terrain characterise this land type.

This land type occurs in five isolated pockets surrounded entirely by the Vienna land type area and located in an area about





Corinth Land Type

midway between the southern and northern ends of the township. The total acreage is only about 1700 acres. The topography of this land type is rolling, having been dissected by the Otter Creek. The elevation ranges from 650 to 750 feet.

The soils are mainly the well drained Haldimand clays but one pocket consists of the poorly drained Brookston clay.

#### The Beverley Land Type

Found in a small pocket in the southwest corner of the township, the Beverley land type area covers only about 1200 acres. This land type is similar topographically to the Corinth Land type, but differs slightly in soils and drainage. The soil is the Beverley silt loam which has an imperfect drainage and contains less clay than the Corinth land type. The area is extremely flat with the only relief being two fairly long gullies stretching back about one-half a mile from the bluff.

## C H A P T E R II

### HISTORY

#### The Indian Period

The original inhabitants of the region which includes Bayham township were the Neutral Indians. They occupied an area along the north shore of Lake Erie from the Niagara River on the east to the St. Clair flats, and were discovered here by Champlain.

Agriculture was first carried on in Bayham township by the Neutral Indians who raised squash, corn, beans and other vegetables. These people also grew a great quantity of tobacco which they called petun, and in consequence, were often referred to as the "Nation of the Petuns".

In 1626 a Franciscan priest, De la Roche Dailton visited the Neutral lands and noted the favourable climate and the abundance of deer, moose, panthers, bears, wild-cats and squirrel in the forests. Later in 1640 the Jesuits established mission stations in the Neutrals' territory, but because they proved so hostile, the priests gave up<sup>1</sup> their attempt to settle among them.

In 1650 the Neutrals provoked the Iroquois to war. Within a year the Iroquois had massacred hundreds of Neutrals and driven them out of southwestern Ontario. This land now became part of the hunting

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1. Coyne, J. H., The country of the Neutrals, in historical sketches of the County of Elgin. St. Thomas, 1895.

ground of the Iroquois. For the next one hundred and twenty years the country of the Neutrals, the beaver hunting ground of the Iroquois, was left deserted and forgotten. The French passed it by because the absence of population made the area of little value to them.

#### Forest Removal and Early Agricultural Development

A very large tract of land in western Ontario, including Bayham township, was purchased on May 22, 1784 by the Crown from the Mississauga Indians. The area near Lake Erie including Bayham township, was governed from 1784 until 1791 by a land board with its head office in Detroit. This land board had the responsibility of locating settlers in the area now called the District of Hesse.

The Government Surveyor, Mr. McNiff, gave very unpromising accounts of the north shore of Lake Erie. This report led the land board to encourage settlement along the Thames River rather than along the shores of the Lake. After 1791 this board was dissolved and the area was ruled from the capital of Upper Canada. In 1798 a large township called Houghton was formed comprising the present townships of Malahide, Bayham and Houghton. Malahide lies directly west of Bayham and Houghton to the east.

In 1803 Colonel Talbot settled at Port Talbot. In the next year he began building a road which would pass through Bayham township. Col. Burwell laid out this road when he surveyed the township in 1809. By 1910 Col. Burwell had separated and surveyed the three townships of Malahide, Bayham and Houghton.

The Talbot road running across Bayham township at a distance of eight miles from the Lake Erie shore had its own peculiar settlement pattern. The road was built by the people settled by Col. Talbot on the adjacent lots. This road served as an access to lands on and near its course and so provided an inducement to settlement.

In Bayham thirty-six lots were granted to the Canada Company, four lots to Kings College and six lots to the Deputy Surveyor, Mahlon Burwell. By removing these Crown and Clergy Reserves from the lots along the line of the proposed road, Talbot was able to locate actual settlers on all the lots on both sides of the road. In other townships large grants made to absentee owners, hindered settlement. But because of Talbot's energies at removing these grants from the road, settlement proceeded quite quickly. By 1840 over one-half of Bayham township had been taken up by settlers.

Colonel Talbot from his head office at Port Talbot, located 158 settlers in Bayham township. Settlement along the Talbot road took place ten years earlier than in other parts of the township.

During this period the farmer spent most of his time clearing the land. The sale of lumber provided his major income. The settlers major crop was wheat which was milled into flour for both his own use and as a cash crop. Oats were also grown to feed their farm animals.

An examination of the numbers of saw mills and grist mills in Bayham township from 1825 to 1846 will give an indication as to the growth and importance of lumbering during this period. It can also be noticed that as early as 1825 there were three grist mills in operation. These mills located at Bayham, Vienna and Willsonburg show that enough wheat was being grown at that early date to merit their construction.

	<u>Saw Mills</u>	<u>Grist Mills</u>
1825	7	3
1826	7	5
1827	8	4
1828	13	5
1829	11	4
1830	11	1
1831	10	3
1832	14	4
1833	15	4
1834	15	4
1835	14	3
1836	14	6
1837	-	-
1838	19	3
1839	17	4
1840	20	4
1841	23	3
1842	28	3
1843	26	3
1844	25	3
1845	25	3
1846	27	3
1849	29	3
1851	38	-

No data after 1851.

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1. Ont. Dept. of Planning and Development, Otter Valley Conservation Report, 1957, Toronto.



The farmer had only a small amount of livestock, but enough to supply his own needs. Most farmers had two or three cows, a team of horses, four or five sheep and a few pigs. About one-third of the land cleared during this period was devoted to pasture for these animals and the remainder used as cropland and hay.

During the early settlement of Bayham two important features affected the locations of towns and villages. The first and more important was the Otter Creek and the second was the Talbot road.

Port Burwell is named after its founder, Col. Mahlon Burwell. Port Burwell is situated on lots 10, 11, 12 and 13 at the mouth of the Otter Creek. Colonel Burwell received lots 10 and 11 in 1811, the remaining lots were Crown reserve land. Col. Burwell was very impressed with the possibilities of navigation on the Otter Creek and recommended the formation of a harbour at the creek and if a village on the adjacent banks. In 1834 Burwell purchased the Crown lots and laid them out in village lots as part<sup>1</sup> of his town plot.

The village of Port Burwell did not grow as fast as Col. Burwell had expected because of trouble financing the development of a harbour. The three thousand pounds received from the government

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1. Historical Atlas of Elgin County, 1877.

in 1837 improved the harbour a great deal but by 1844 the harbour entrance was blocked up by silt and the entrance was of no use. A few years before 1844 the harbour had been the outlet for a large lumber business located at Vienna. Port Burwell in 1841 had "several stores, a good tavern, and an elegant Episcopal Church recently built (1836)<sup>1</sup>".

In the 1840's the harbour was dredged and a breakwater erected. This development of a good harbour greatly aided the growth of the town during this period when lumbering was the dominant industry.

In its greatest years 200 to 400 shiploads of lumber left this port. In 1850, 190 ships carrying lumber went to the United States' ports of Cleveland and Buffalo and a considerable number of white pine masts were sent to Great Britain.<sup>2</sup> Near the end of the timber industry, shipbuilding became quite important and many ships of various sizes were built.

Vienna is located on the Otter Creek where a large tributary enters the stream. Both streams provided good mill sites and several saw mills and a grist mill were erected in the early 1820's. This location was also the head of lake ship navigation on the Otter Creek.

Named after the Austro-Hungarian capital by the Edison

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1. Rolph, Thomas, "A Descriptive and Statistical Account of Canada", London 1841, Page 240.
  2. Murdock, B., An Article on "Vienna", Hamilton Spectator, November 3, 1956, Page 37.

<sup>1</sup>  
family, Vienna was laid out for a village in 1834. Mr. J. Smith and Mr. S. Edison were the two original owners of the land, the former actually drawing up the plot for the village and obtaining Mr. Burwell's approval.<sup>2</sup> At that time Vienna was composed of Mr. J. Smith's lumber mill and several houses. By 1858 the lumber trade had flourished to such an extent that Vienna was incorporated and was described as "one of the most stirring business places in Western Canada".<sup>3</sup> There were sixteen general stores and several shops with workers in iron, leather and wood. At this time the Otter Creek was navigable to the lake and rafts of lumber were floated down to Port Burwell with horses working along a tow path. Many schooners sailed up the Otter to Vienna and for some time a shipyard was in operation building such schooners as the "Pine".

In 1855 a fire destroyed practically the entire business section in Vienna. Previous to this fire there were seven saw mills in operation and five or six taverns. The village was rebuilt but in 1867 another fire destroyed the business section and the village never regained its former importance.

Situated at the intersection of the Otter Creek and the Talbot road, Bayham was one of the more important villages during this period. Bayham was first settled in 1811 by two settlers, one

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1. Murdock, B., An Article on "Vienna", Hamilton Spectator, November 3, 1956, page 37.
  2. Historical Atlas of Elgin County, 1877.
  3. Ibid.

being the district's first magistrate, Mr. De Fields. Several saw mills and a grist mill were constructed by 1820.

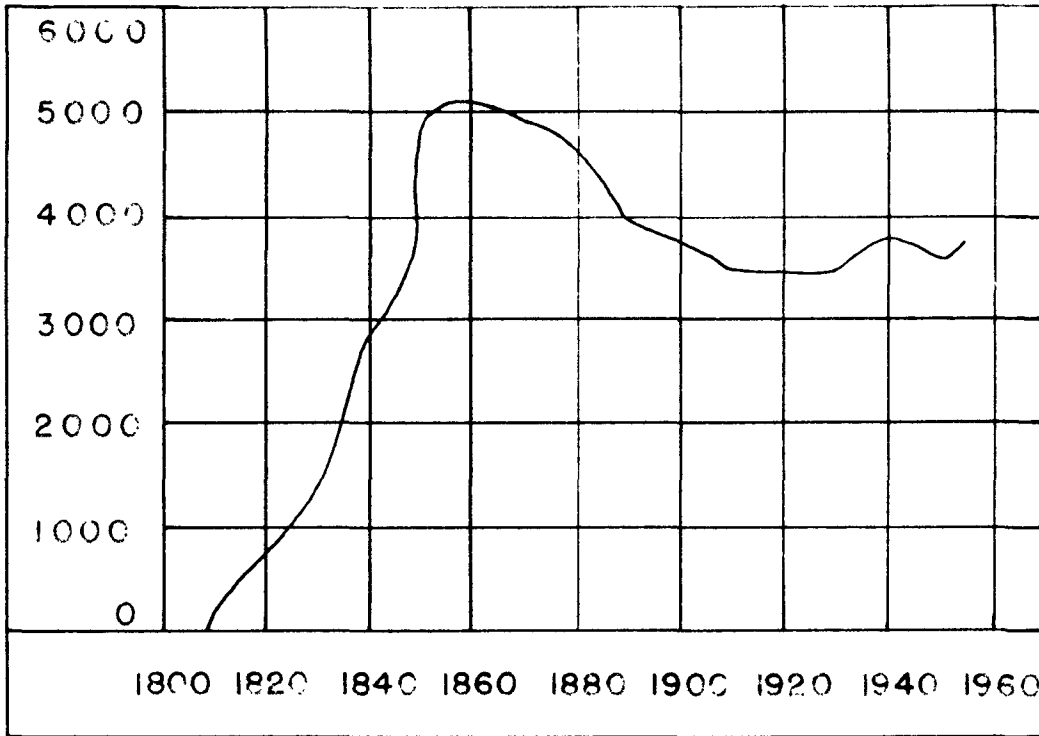
By 1837 the village had three stores, two tanneries and two hotels. By this time the saw mills and grist mills had increased in number and importance. The population at its height in 1857 was about 500 people.

Located on the Otter Creek a mile north of Bayham was a small town called Willsonburg. This small centre lasted for some forty years, between 1820 and 1860. At its peak in 1850, it had a grist mill, a carding mill, a fulling mill, a saw mill, a thriving general store and a blacksmith shop. After 1860 only the grist mill stayed in operation. The decline of this hamlet was due to the change in transportation facilities in the township and to the change from a lumbering industry to a more extensive agricultural economy.

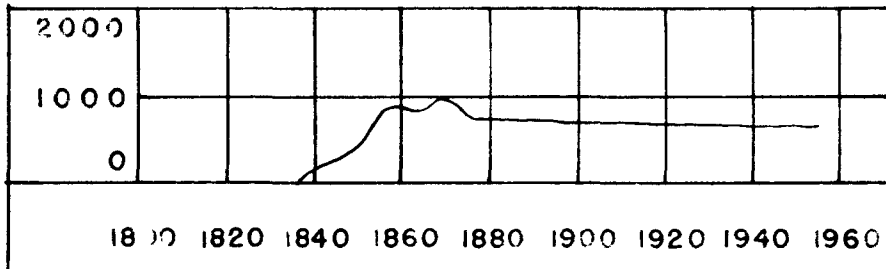
The remaining urban areas were not centred on the lumber business or dependent upon water power for small industries. They therefore originated somewhat later than the first four mentioned and came into being because of different circumstances.

Straffordville was laid out as a village in the early 1840's at the intersection of the main north-south route and the Talbot road. In 1851 the Plank road was built between Ingersoll and Port Burwell passing through Straffordville. In the same year

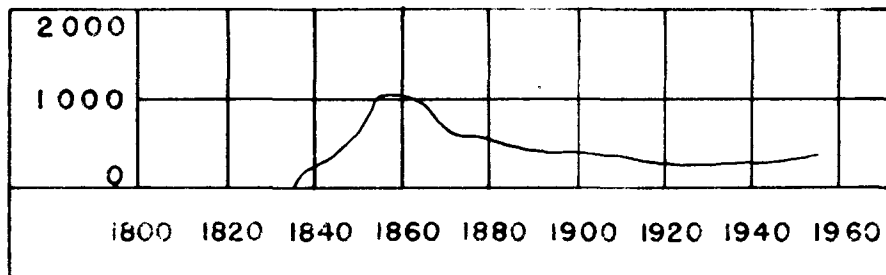
# POPULATION



## BAYHAM TOWNSHIP



## VILLAGE OF PORT BURWELL



## VILLAGE OF VIENNA

the Talbot road was repaired considerably. These factors combined with the increase of the agricultural industry were the chief factors in the growth of the village.

The settlement which began in 1810 in Bayham reached a maximum in 1850 when 5100 people were reported in the rural areas. The growth of population during this period was rapid and uniform. This growth meant that most of the land was taken up and now in the process of being cleared. This process was slow and by 1851, only 22.2% of the land had been cleared.

The urban areas based upon lumbering grew rapidly during this period. Many mills dotted along the stream attracted workers.

This population growth can be seen on Figure I.

#### Extensive Agriculture

After 1860 lumbering declined rapidly and agriculture became the dominant industry in Bayham township. The percentage of the total area in woods dropped from 77.8 to 10.8 between 1851 and 1911. By 1911 a maximum amount of cropland and pasture land had been cleared leaving only the roughest areas along the creek and the poorly drained areas in scrub woods. Up to 1900 the acres under cropland generally increased, but after this time a decrease is noted. The farmers ruthlessly cleared off large fields in the very sandy areas and did not worry about wind erosion. As a result many acres were badly eroded and ruined in this area. Most of the



farmers tried keeping the soil fertility up by the use of fertilizers, but many did not keep a permanent cover over the loose sand. With the introduction of fall wheat at the turn of the century, a permanent cover was kept on much of the soil and thus hindered erosion. Up to 1900 wheat acreage was increasing but leveled off at the turn of the century, and slowly began to decline. The increasing loss of cropland accounts for this slight drop in wheat acreage.

The years around 1900 seemed to be the climax for several other agricultural products and statistics. From 1850 until 1900 an increase was shown in livestock but all decreased in number after 1900 except cattle, which continued to increase slowly. Sheep were the hardest hit, going from 6,000 in 1861 gradually downward until after 1900 and they dropped out of the picture completely. This probably was due to the combination of light soils and the devastating manner in which sheep tear out the grass.

During the latter part of the 19th Century a more specialized dairy industry developed in the northern section of the township. This section is found on the heavy clay soils. Hay and pasture lands became important and increased in acreage. Corn began to be grown around 1900 on a much greater scale than before. Silage corn took the place of oats in the dairy region being used as a feed for cattle. This dairy region developed here because the soils produced excellent fodder and this area was close to the urban markets of Tillsonburg and Aylmer.

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In the light textured soils of the south and southwest, ear corn steadily became a favourite cash crop.

The decrease in woodland as the settlers cleared their land was rapid up until 1910. After this time the small remaining area of woodland began to show a slight increase. The following figures give remaining woodland in percent., estimated from Census of Canada figures:

<u>1851</u>	<u>1861</u>	<u>1891</u>	<u>1911</u>	<u>1921</u>	<u>1931</u>	<u>1941</u>	<u>1955</u>
77.8	55.1	26.1	10.8	12.9	15.7	12.4	20.6

The urban areas dependent upon water power and the lumbering industry declined in this period. Other centres dependent upon the agricultural industry became important. After 1870 a slow but steady decline in the population of Port Burwell has taken place. The advent of steel ships and the exhaustion of the lumber supplies have been the chief causes of Port Burwell's decline in importance. Fishing remained its chief industry until after 1900 when it began to be used as a coal port.

It is probable that the decay of the lumber trade had most to do with the decline of Vienna as a business centre. The population returns clearly show this decline.

The villages of Willsonburg and Bayham declined rapidly during the late 1860's. Willsonburg became a ghost town before 1900 and the population of Bayham was reduced to 100 people. The decay

of the lumber trade accounts for this decline.

Two small villages developed during this period. Corinth developed after 1870 where the Air Line Railway, now the Canadian National Railway intersected two roads in northern Bayham. The Corinth Cheese Factory developed into a very important industry during the late 19th Century. At its height Corinth boasted several general stores, a post office, a blacksmith shop, a saw-mill and several churches. After 1900 the town declined in importance as the rural population decreased and the farmers began to send their fluid milk to Tillsonburg and Aylmer.

Eden has a somewhat similar history to that of Corinth except it has not had the great decrease in population. Built on Highway #19 and the Canadian Pacific Railway, it did not begin to grow until after the lumbering boom. Eden's growth depends upon the local agricultural development. During this period it served as a distribution centre with several mills, stores, blacksmith shop, two churches, a post office and a lumber yard.

Straffordville at first flourished but at the turn of the century the village experienced the same recession as the agricultural areas. Many areas of light sand were laid waste by wind erosion and it was not until these sandy areas were reclaimed that Straffordville began to revive.

It can be observed on Fig. 1 that the population in both the villages and the township declined in this period. This was due mainly

to the decrease in lumbering.

### Intensive Agriculture

During this period a great change came to a large area of Bayham township. Tobacco was introduced into Southern Ontario on a large scale. In 1921 there were but four acres of tobacco in the township and by 1937, there were 4,378 acres of bright leaf, flue cured tobacco under cultivation. This acreage has rapidly increased up to the present time. The introduction of this crop into the agricultural economy of Bayham township has brought many changes both agriculturally and non-agriculturally. A similar increase was experienced with the rye crop. In 1921 the rye crop was a meager 620 acres, but now it occupies an equal, or not larger acreage than tobacco.

The remaining areas of non-sandy soil in Bayham township experienced very little change in their land use pattern. The raising of hogs took a sharp rise in 1941, which can be explained by the increase in the price of bacon during the war.

Straffordville is the only urban area in Bayham township which has increased in size and importance during this period. Port Burwell continued its slow decline in population. It is only within the last twenty-five years that the population of Vienna once again has started slowly to increase.

The population of the township is slowly rising, but actual

agricultural population has remained steady for the past few years. A drop in the rural population took place in the early 1920's when the sandy areas had become very run down and showed a small profit to the farmers. When tobacco was introduced a rise in the population was experienced until the tobacco area was once again being fully utilized, and all the farms were under production.

## C H A P T E R III

### PRESENT FEATURES

#### Agricultural Land Use

Agriculture is the dominant industry of Bayham Township. The agricultural population of Bayham township comprises 55.6% of the total population. The generally level topography, the favourable climate and soils combined with the very energetic and progressive nature of the farmers, have been the factors which have contributed to the prosperous state of the industry. This prosperity has been due to some extent to the specialization of the products produced. A good indication of this prosperity can be seen in the many new homes, farm buildings, machinery and automobiles.

The degree of intensity of the agricultural use of the land is not uniform throughout the township. Differences in soil texture, topography and drainage have produced significant variations in the land utilization of the region. Transportation has also had a minor effect on the land use pattern. It will be seen that the change-over from general to tobacco farming has not been complete in some areas.

Cultural differences among the population have had no appreciable effect on the land use pattern. It was found that the tobacco growing region was populated mainly by people of foreign extraction. The nationalities represented are mainly Belgian, Hungarian, German and Czecho-Slovakian; most of whom were born in Europe and emigrated in the last thirty years. Many of the foreign peoples



emigrated to Canada to become farmers and bought these tobacco farms when their value was low. The remaining regions have a majority of Anglo-Saxon peoples.





Many of the farmers in Bayham township are using sound soil management practices which are basic to good land use and soil conservation. Most unproductive soils can be made useful by intelligent management. Tobacco farmers in particular are finding out new practices that will reduce erosion and maintain a highly productive soil. Much of this information on tobacco is obtained from the Dominion Experimental Substation at Delhi, Ontario, while literature and advice concerning other agricultural crops and practices can be obtained from the Ontario Agricultural College at Guelph.

The assessed land values in Bayham have steadily increased, especially in the tobacco area. Much of this land had a low assessment during the 1920's, but now the average farm here has a higher assessment than one on the non-tobacco areas. The assessment is based on land use as well as on the physical qualities of the land. In the tobacco area, for example, the land which is actually producing tobacco is assessed at a higher rate per acre than land with similar physical characteristics which is producing rye. If the farmer has not made the transition from mixed farming to tobacco farming, his land, although it is potential tobacco land, is not assessed as such. The land in the tobacco areas is classified as Grades I, II, III or IV tobacco land, while in the non-tobacco area a somewhat similar method

# BAYHAM TOWNSHIP

## LAND USE REGIONS

### LEGEND

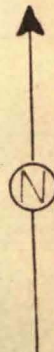
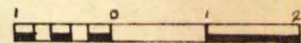
-  TOBACCO
-  CASH CROPS
-  MIXED DAIRY  
& CASH CROPS
-  DAIRY



LAKE ERIE

### SCALE

1/2 Inch to 1 Mile



of computing the value is used.

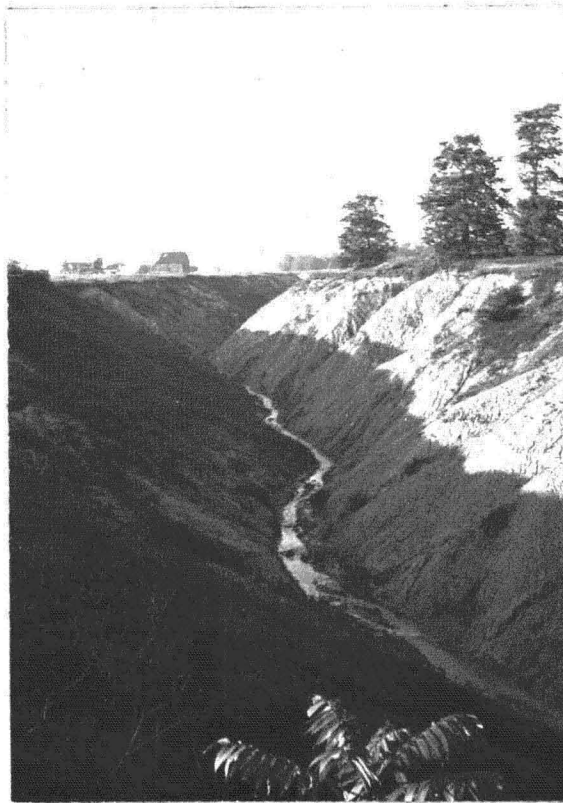
The change in land values over the past few years can be seen more clearly from the actual sale value of the land. The value per acre of several tobacco farms near Straffordville rose from \$40 to \$60 per acre in 1925 to \$550 to \$600 per acre in 1957. The tobacco farms range in value from \$40,000 to \$60,000 per 100 acres. This value is subject to many factors which will be more fully explained and a discussion presented in the land use regions.

The non-tobacco areas were not subject to such a great increase over the past thirty years. In 1925 their land value was greater than the sandy section with farms valued at \$7,000 to \$10,000 per 100 acres. In 1957 good, cleared, dairy farms and mixed farms were valued at \$15,000 to \$20,000 per 100 acres, depending upon the buildings.

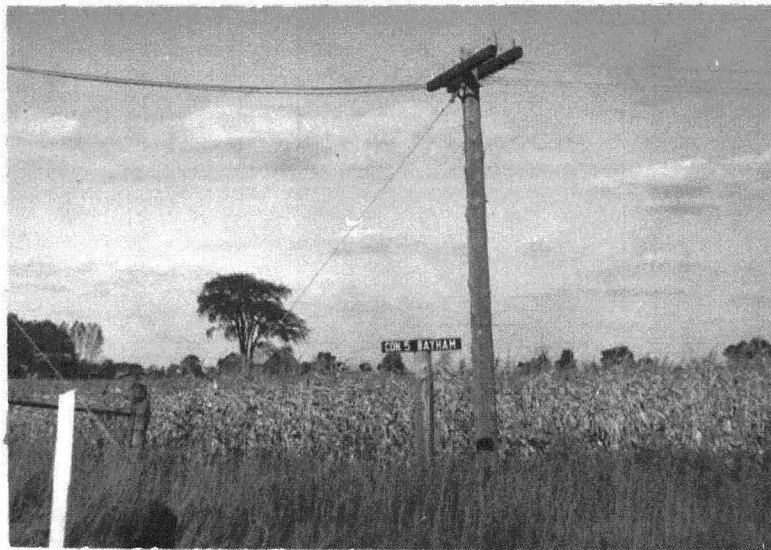
We will now proceed to examine more closely the land use pattern. For this purpose the township has been broken up into four land use regions.

#### Cash Crop Region

This region is located in the southwest corner of the township except for a small outlier comprising 250 acres which is found farther north and east within the tobacco region. The larger area, 2700 acres in extent, is very flat with rather poor natural drainage. The soils are chiefly the Beverley silt loam with some of



Erosion on the Cash Crop Region



Corn is a Favourite Cash Crop Throughout the Region.

the heavier Brookston sandy loam in the northern section. This area comprises all of the Beverley land type and a small section of the Straffordville land type.

Corn is the major crop of this region, occupying at least two-thirds of the total area. Wheat is the next crop, while oats, hay and pasture occur only in small amounts. All of the better drained land is cleared, but several imperfectly drained sections remain in bush.

The corn grown is all of the ear or husking type. Large fields 80 chains wide and one-half a mile long are not uncommon. The climate near the lake is ideal for this type of corn. Having well over 200 growing days in which to mature, the hybrid corn produced rates with the best in Ontario. Because the growing season is somewhat longer close to the lake, a variety of corn which requires this long growing season can be grown. Large corn-cribs used by the farmers to dry the corn are a common sight. All of this corn will be shipped to feed mills later in the winter as none is used on the farms of this region.

Wheat, the next largest crop is all of the winter variety and like corn is grown for cash sale. The wheat is combined late in the fall and the straw is usually ploughed down to aid in the fertility.

There has been a change over the past thirty years from a

more general mixed dairy farming to this more specialized type of cash cropping. The reasons for this are partly economic and partly physical. This can be seen in the many poorly kept barns. Neither the wheat nor the corn are kept in the barns, the former being sold immediately after harvest and the latter kept in cribs. One or two cows and the machinery are all that occupy some of the once large dairy barns. Because the larger urban areas lie twenty miles and more to the north, this region will find it very difficult to compete with the dairy regions on the clay plains. The soils are not as favourable for hay as the northern sections. This type of cash crop farming gives the farmer a greater net income than either mixed farming or dairy farming.

The main problem for these farmers is drainage. The land is quite often difficult to cultivate in the spring and sometimes with excessive rainfall the crops may be drowned out. Furthermore, this type of agriculture is quite exhaustive and the fertility of the soil will easily be depleted if proper soil management practices are not undertaken. To retain this fertility these farmers must purchase manure and apply fertilizers to offset the phosphorus and especially the potash deficiency, which in this type of agriculture would otherwise reach serious proportions.



Mixed Dairy and Cash Crops

This region is found in the eroded areas near the Otter Creek in the south and mid-western section of the township. Comprising roughly 9500 acres which is one-sixth of Bayham township, it is very irregular in shape as well as in topography. This area is badly eroded and dissected by the Otter Creek and its tributaries and contains a complex soil pattern. The majority of the soils are mixed Ottawa sand and Miami silty clay loams with the clays and silts predominating. The remaining soils are the Haldimand clays found near Bayham and small sections of coarse, poorly drained sands and loams.

In comparing this region to the land types it is found that it includes the southern section of the Vienna land type and two of the five pockets of the Haldimand land type along with a very small section of the Straffordville land type. These land types extend farther north than this land use region. This region, therefore, is similar physically to southern sections of the dairy region. It will be shown that the regions are divided because of economic factors rather than physical.

Mixed dairy and cash crops indicate a very diversified economy. In response to the differences in soils, topography and drainage, the land use pattern also varies throughout the region. On the lighter soils and flat land, corn and wheat are the dominant crops and the farms are similar to those near the lake. The heavier soils and areas with rough topography give rise to mixed farming.

Some tobacco is grown in various places but most if it is of marginal quality and the farmer might do as well by planting corn or wheat instead.

The dominant crops in this region as a whole are wheat and corn. The corn when grown is usually the dominant crop on the farm. One farmer has 300 acres in this region and has 250 acres of corn in one large field. This corn is also the ear or husking type. To go into the corn growing business a lot of expensive machinery is needed. This is the reason for corn being grown either on a large scale or a very small scale. The large scale farmer has all mechanized equipment, such as planter, rotary hoe, sprayer, picker and elevator. The small farmer usually plants by hand, hoes his crop himself and picks the crop by hand. In this region there are large river flats and terraces, many of which are devoted to corn. Often flooded in the spring, the flats could not be planted in winter wheat, but corn does very well on this soil.

Wheat is very extensively grown, especially in the back fields of the farms bordering the gullies. Many of these farmers previously had dairy cattle, but have discontinued dairy farming and now have only small herds of cattle which can be pastured on the rough land providing him with a small return in milk and fertilizer for his cash crops. There are several reasons for this change. Most of the farms are broken up by gullies leaving many fields a long way from the barns, which makes them difficult to use as pasture. Fencing the gullies has



Corn field in Mixed Cash Crop and Dairy Region



A Pasture Field in Dairy Farm Region

been difficult due to erosion.

Dairy farms are on a small scale and are found to the north in this section. The numbers of cows increase directly as one proceeds north. This may be because the dairies of Tillsonburg as well as the Borden and Carnation Milk factories, located in Tillsonburg and Aylmer respectively are offering competitive prices for milk as compared to cash crop returns per acre. Soils also become heavier in texture in the northern section of this region providing better pasture and hay for the cattle.

The farms in this region are not as a rule very prosperous. The farmer spends far more time going to and from his fields, in fighting erosion and in many other jobs such as mending fences broken by erosion, than do the farmers on undissected land. The tendency is for the farms to become larger, the fences to be torn down and the farms to be transferred into cash crop farming. The most prosperous farmer is the cash crop farmer who contour crops his slopes, plants grass waterways and in general plants his crops with an eye to preventing erosion. Pasturing the gullies and rough areas in the farm is proving not to be the most efficient method of agriculture.

#### Dairy Region

This region lies in the northern section of the township. The change from mixed dairy and cash crops to a dairy region is gradual. The soils are mainly clays and heavy silts with some small scattered areas of sand. Most of the region is very flat to gently

sloping producing some poorly drained areas. The total area of the region is 10,500 acres. All of the land types are represented in this region though the major land type is the Corinth, which occurs exclusively here. Clearly then the land use of the region is not dependent primarily on physical influences.

The most extensive single type of land use is pasture. Hay, mainly alfalfa because of its high protein value, is the leading crop, but other crops are also grown, such as corn, wheat and oats. Very little land except near the creek or in poorly drained areas remains in woodland.

The corn is grown quite extensively and is used for silage. Some farmers plant a hybrid corn which is a cross between silage and ear corn, and pick much of the corn, which they sell and put the stock in the silo. This, however, is not too successful, as much of the total digestible nutrient is lost and the resulting feed will be too dry and unpalatable. The heavy soils and <sup>the</sup> climate are excellent for silage corn in this region. Ear corn can not be planted as early and because of heavier soils it may not mature as well, but it still is grown as a cash crop by some farmers. Wheat is now displaced by oats as the dominant grain crop. Oats are a very popular dairy feed because they are very palatable, bulky and higher in protein than corn. Wheat is fed to hogs and chickens or sold as a cash crop.

The farms in this region are much more prosperous than in the two regions dealt with previously. The barns are large and well

kept and the houses are relatively new and modern in appearance. An air of prosperity reigns particularly in the clay area where homesteads have been handed down for three generations in many cases.

As the name given the region indicates, the chief product is fluid milk. There are four main markets for milk in this area. The Corinth Cheese Factory, much more important earlier in this century, now uses only a small amount of the local farms' milk. More important is the Carnation Milk Factory at Aylmer and the Borden Factory at Tillsonburg. As can be expected the farmers in the western edge of the township ship to Aylmer while those in the eastern section ship to Tillsonburg. The least important market is the dairies of the town of Tillsonburg, whose milk shed extends only into the township at its northeastern edge. Holstein cattle are the most common breed with several herds of Ayrshire. Most farmers milk about twelve to fifteen cows with some larger operators milking up to thirty-five. All the farmers ship with cans which indicates that the area is not within the milkshed of a large urban centre, which would haul the milk by tank trucks and require the farmer to use a bulk cooler system.

#### The Tobacco Land Use Region

The tobacco land use region is the largest of the four land use regions in the township. It comprises roughly 34,000 acres or 60 percent. of the total area of Bayham. The size, shape and location of this region is shown on Map VI. This region includes all the tobacco farms in Bayham township. Many farms, although they grow



Farm Pond



Erosion Caused by Over-Pasturing



tobacco are not good tobacco farms but nevertheless, are included in this group.

Immediately after the recession of Lake Warren this region was a featureless sand plain but now its horizontality is broken by moving wind dunes and in many places gullies have been formed by the Otter Creek and its tributaries.

A comparison between the land use regions map and the land types map will show a close correlation between the Straffordville land type and the tobacco region. Only the more poorly drained areas within this land type are excluded from the tobacco region. On the other hand, some sandy sections of the Vienna land type area are in the tobacco growing region. These are found mainly in the northern section of the township along Highway #3.

The soils here are thus all sands or very light, sandy loams. Soils containing considerable silt and clay tend to produce inferior leaf, deficient in "body", aroma, texture and colour. The best type of tobacco soils can be described as soils light in texture, open in structure, low in organic matter, well drained and slightly acid. About one-half of the tobacco region in Bayham township has soils of this optimum type. These soils include the Plainfield sand, the Oshtemo loamy sand and the Berrien loamy sand. The physical characteristics of these three soils are, Sand 79 - 86%, Silt 7 - 13%, Clay 6 - 8%, organic matter 1.0 - 1.8% and having good drainage. A pH of 5.6 or 6.6 is desirable.

Climate has considerable effect on the quality of flue cured tobacco. (Successful crops are largely dependent upon the amount of rainfall during certain periods of the growing season and the length of the frost-free period.) Tobacco requires approximately 125 frost-free days from transplanting to the end of harvest. Tobacco also requires a fairly dry period two to three weeks after transplanting, followed by regular weekly rains of approximately one-half inch until the commencement of harvest. An average rainfall of 14 inches well distributed throughout the growing period appears sufficient. The temperatures throughout the summer must be quite warm to aid in the growth and maturing of the tobacco. During July and August the rate of evaporation and transpiration is high, and because the light, sandy soil has a low moisture reserve irrigation water must be applied to attain good results.

In comparing the desirable tobacco climate with that of Bayham it can be seen that the climate of Bayham township has practically all the desired qualities. Most of the farmers in Bayham township are very fortunate in having the Otter Creek available for irrigation purposes. Very few farmers are more than one mile from a stream. Many farmers have dammed up the small tributaries while others dig a pit in the stream bed and pump directly from this pond onto their land or to reserve ponds near their tobacco fields. Many still rely on rain water together with springs and wells to fill their ponds. To



Tobacco in the process of being harvested. Note tobacco kilns in background.



Tobacco land after harvest. Note stubble and rye cover. Also note poplar windbreak and pines on sand dune.

prevent downward percolation of this supply of water they either line the pond with clay or in accordance with the more modern practice, line it with a large sheet of plastic material. The latter method has proven to be very efficient.

The imperfectly drained areas west of Vienna grow very poor tobacco, off-colour and with little "body". The areas within two miles of the lake and near Corinth have a clay subsoil producing a "cold bottom" which gives an inferior quality. Near the lake, however, there is the compensation that the first killing frost is usually two weeks behind that of the Straffordville area and very few crops have been lost by frost in the Port Burwell area. On the other hand, the land near Corinth is of marginal value for tobacco and might well be more profitably used for general farming.

The crops in this tobacco region are almost exclusively tobacco and rye. Little if any cattle are seen in the region. Some farmers may have one cow for their own use, but they are the exception and not the rule. Horses on the other hand, are found on every farm during the summer months. These animals are used throughout the tobacco season and it is only on the flattest fields, and only recently, that they have been replaced by tobacco harvesting machines. A trend is developing where the farmer rents two horses for the summer months. The horses are trucked to the tobacco farms in the spring and back to the large horse farms farther north after the harvest has been

completed. In consequence, during the winter many tobacco farms have no livestock at all. This explains the fact that as one enters the tobacco region the lack of fences is immediately noticed. Large fields are divided only by a change in crop. Strip farming has been introduced to increase the crop acreage and cut down operating costs.

Tobacco growing is controlled by the Ontario Tobacco Marketing Board. Tobacco "rights" are given to the farmer by this board. The chief requirement is that the farmer must have two acres of tobacco land for each acre of "rights". Very few farmers in Bayham have full "rights" but in most cases their acres of "rights" are almost one-half of their total tobacco land.

A two crop rotation of winter rye and tobacco is the general practice. The following is a description of this rotation and the practices and methods used in the handling of both crops:

Rye is seeded in the fall after the tobacco harvest and grows enough to protect the land from erosion during the late fall. In the next summer the rye is combined at maturity, the straw then disked under and the land reseeded with rye to produce a green manure crop. Some farmers instead of combining the rye, disk it under at maturity. The mature seeds will produce the desired green manure crop.

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1. A further discussion on the Ontario Tobacco Marketing Board is found in Appendix B.

In the latter half of March the farmer begins to get his greenhouse ready for planting. Each year new muck must be put in the greenhouse and the old muck thrown out. This new muck bed is steamed prior to planting to kill all the diseases that might be in the soil. Seedbeds in Bayham are usually sown the first week of April. These plants will be ready for transplanting in the latter part of May and early June.

Prior to the actual transplanting the fields must be worked and the green manure cover ploughed under. On approximately May 24 transplanting begins in Bayham township. Two or three women are required in the greenhouse to pull plants while three to four men do the transplanting. Most of the work is done by hand and the extra labour is usually local people. By June 10 most of the transplanting has been completed.

Fertilizer is applied at this time by using a fertilizer attachment on the transplanter. The quantity of fertilizer needed in any one field increases until at least five crops of tobacco have been harvested. After this time a continued two crop rotation plus a given amount of fertilizer achieves the desired results. A detailed report on the application, amounts and strengths of fertilizer applied to the various soils will not be necessary but it can be pointed out that a 2-12-10 fertilizer at 1000 lbs. per acre is sufficient to produce good yields of high quality tobacco on most of the tobacco farms in the sandy district. On the heavier sandy loam soils of the

mixed soils a 2-18-18 fertilizer is generally used.

During the next month and a half the tobacco grows very quickly. The plants are dusted by a plane during this time to kill the tobacco worms. Hoeing is done both by hand and by means of a rotary hoe. Hoeing is usually done by local help, many of whom are of high school age.

The farmer is preparing for harvest - his kilns must all be thoroughly inspected as to heating equipment, doors and rafters. Tobacco boats must be repaired and bunk houses made ready for their future inhabitants.

About the first of August the tobacco harvest begins. This job requires the hand labour of a great many men and women. As a result thousands of people leave the cities to work in the fields for this period. Most of the workers come from Hamilton, Toronto, the southern United States and, especially, Montreal. In 1957 over 5,000 people came up from the southern United States. The towns swell to four or five times their normal size during the first two weeks of harvest. Most of the workers come to such centres as Delhi and Tillsonburg and wait on the streets until they are hired and taken to some farmers home. Riots, thieving, and holdups are common.

The store-keepers, garages, theaters, and especially the hotels, do a greatly increased business during the harvest period. Most of the workers were poor and in many cases without many clothes





Well-Kept Tobacco Farm near Straffordville



Tobacco Buildings. Note the greenhouse, pack-barn, water tower, kilns and steam engine. Also note used muck beside greenhouse.

before the harvest. Their first reaction after receiving their weekly wages is to buy some of the articles that they have gone without. Many harvest workers leave this area with little more than when they entered, except a very sore back!

The harvesting process is a very difficult and strenuous task. There are six men in the field picking the tobacco. At the kiln there are six more people, usually women, who tie the tobacco on slats. At the end of the morning and after the day's work in the field is done the men hang these slats of tobacco up into the kiln. The men picking the tobacco, or "Primers" must pick enough tobacco in each day to fill one kiln. This is a day's work and they are all paid by the day. The average rate in Bayham last year was \$12 per day plus board. All of the transient workers board at the farmers bunkhouse.

This tobacco which was put into the kiln is dried by means of heat supplied by either gas, wood, coal or, now more common, by oil. A man called a "cureman" looks after the tobacco while it is being dried. Most of the "curemen" are "Southerners" who have already harvested one crop of tobacco in the southern United States earlier in the year. The tobacco is heated for six days until it becomes bright and dry. It is then taken out of the kiln and stored in the packbarn.

By mid-September the harvest is over. The workers pack

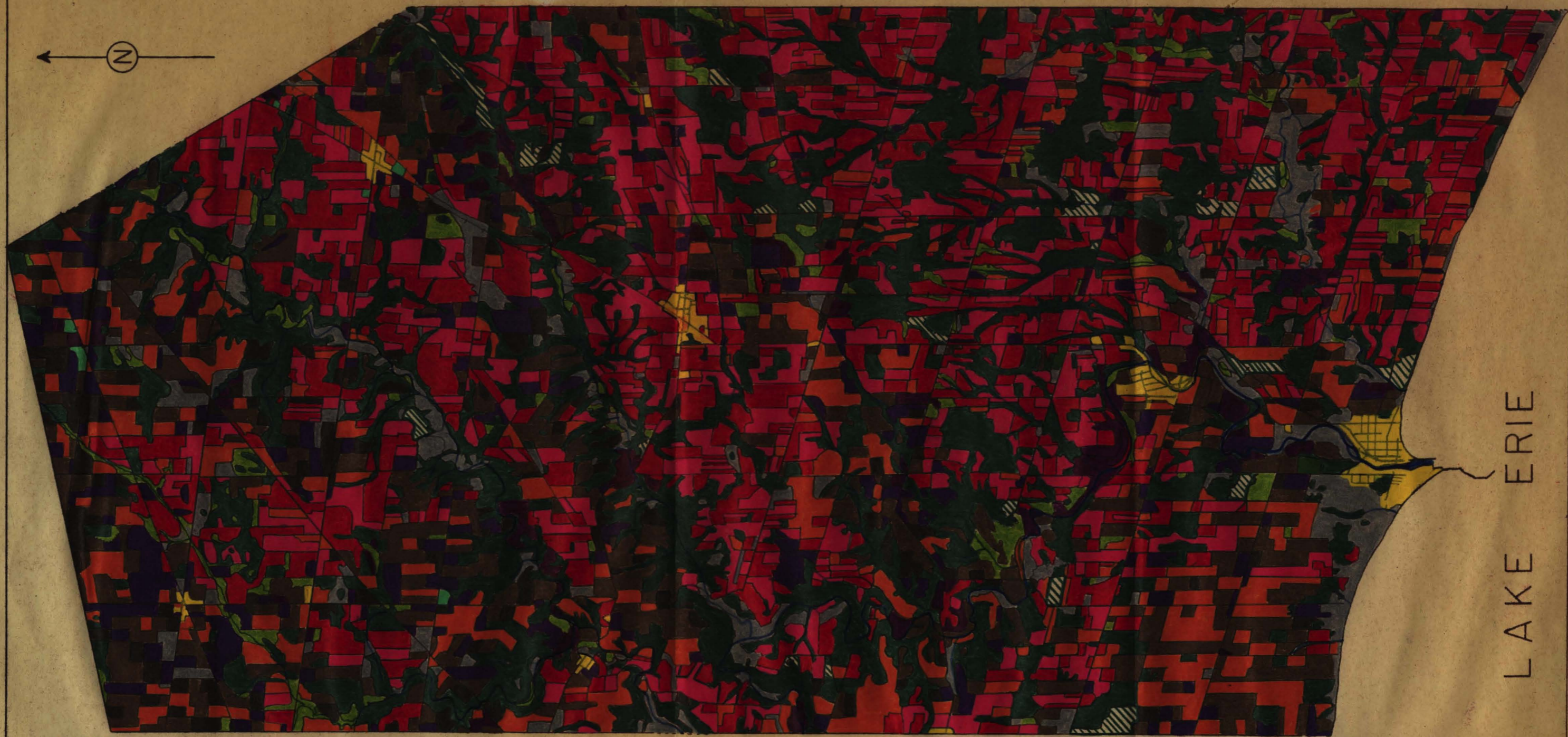
up and go back to the cities and the entire community seems to have a little rest for a few weeks. Very little work was done from this time until after the tobacco was bought. With the new marketing system, however, the stripping of the tobacco will probably commence immediately after harvest. This process is one where the tobacco is graded and packed into bales ready for shipment to the factories.

After the harvest is over the tobacco stocks are cut down and rye is planted. This marks the start of another two year crop rotation.


















Tobacco farming is becoming more and more profitable each year. As the industry matures, more is found out about the soils, new varieties of tobacco, diseases and insects are controlled, weeds are eliminated and new types of machinery such as the harvester are invented. Also water deficiency is controlled through irrigation.

The above changing features can be seen in the tobacco region of Bayham township. Over the past few years diseases and insect pests have been almost eliminated by spraying. The method of spraying has changed from horse-drawn water sprayers to aeroplane dusting. Only two or three years ago hoeing was a major expense for the farmer. In 1957 very few crops were hoed even once, showing that the weeds are being eliminated. In consequence yields are increasing, quality is improving and a larger cash return is realized per acre.

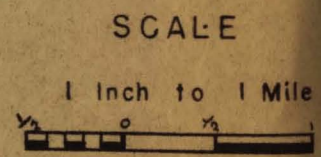




# LAND UTILIZATION IN BAYHAM TOWNSHIP

- |  |   |   |
|--|---|---|
|  HEAVY FOREST |  HAY                       |  APPLE ORCHARD |
|  SCRUB FOREST |  PASTURE (ROUGH)           |  PEACH ORCHARD |
|  TOBACCO      |  PASTURE (IMPROVED)        |  STREAMS       |
|  RYE          |  IDLE LAND (VACANT-FALLOW) |  ROADS         |
|  CORN         |  URBAN LAND                |  RAILWAYS      |
|  GRAINS       |  REFORESTED LAND           |   |

LAKE ERIE





A change which may aid this entire industry is the new marketing techniques. This year a drastic change was made in the marketing system for all the tobacco farms. This factor alone could be responsible for increasing or decreasing the prosperity of the tobacco region.<sup>1</sup>

In looking closely at the land use map and the soils map it can be seen that there are only a very few farms within this region that have not switched to tobacco. Two of the farmers who were interviewed did not grow tobacco because of religious convictions. Several other farmers said they would grow tobacco if they had the capital to get a start. But as a township on the whole, practically all of the tobacco land is being used for this purpose. In 1957 there were 9,606.25 acres of tobacco on 309 farms. Bayham has more acres devoted to tobacco than any other township in Elgin County and ranks fifth for the province of Ontario.

#### Urban Land Use

There are no urban centres of major importance in Bayham township. Even those communities which exist are now declining in population and importance with the possible exception of Straffordville. This village grew rapidly with the introduction of tobacco but within twenty years, it too may be on the decline.

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1. A discussion on marketing will be found in Appendix B.

The present land use of each urban centre has been studied and for three centres land use maps were produced. In the residential areas four types of housing were recognized and mapped. The criteria of quality is lower than that found in larger urban centres.

1st Class - These are well kept, relatively new homes made of brick or frame homes of very recent construction. The latter are, as a rule, quite large, ranch-style homes. They have private water and sewage facilities.

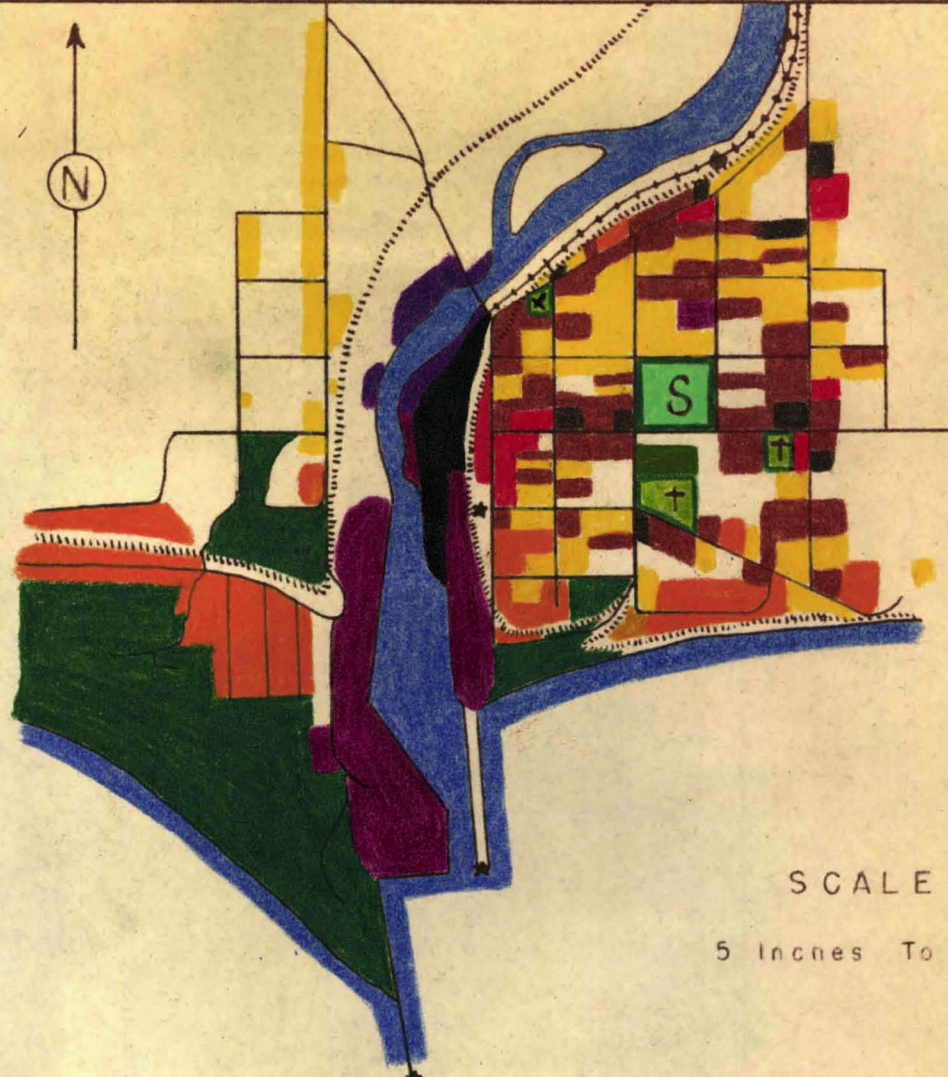
2nd Class - These are well kept frame houses of medium age with no real signs of decay. They are constructed of brick and stone, are usually smaller and older than the 1st Class and most of these homes lack water and sewage facilities.

3rd Class - This category contains the poor homes. The houses are made of wood and all lack water and sewage facilities.

Cottages - All cottages are classified together.

#### Port Burwell

Port Burwell is the largest centre in Bayham and is an incorporated village with a population of 722. It is located on the Lake Erie shore at the mouth of the Otter Creek. Number 19 highway and the Canadian Pacific Railway running south through Tillsonburg



SCALE

5 inches To 1 Mile

# PORT BURWELL

## HOUSING

- FIRST CLASS
- SECOND CLASS
- THIRD CLASS
- COTTAGES
- TRAILER CAMP
- S SCHOOLS
- ↑ CHURCH
- CEMETERY

- RETAIL ZONE
- FISHING INDUSTRY
- COAL INDUSTRY
- RAILWAY PROPERTY
- RAILWAY
- PARKS AND RECREATIONAL LAND
- IDLE LAND
- WATER

--- BREAK IN SLOPE

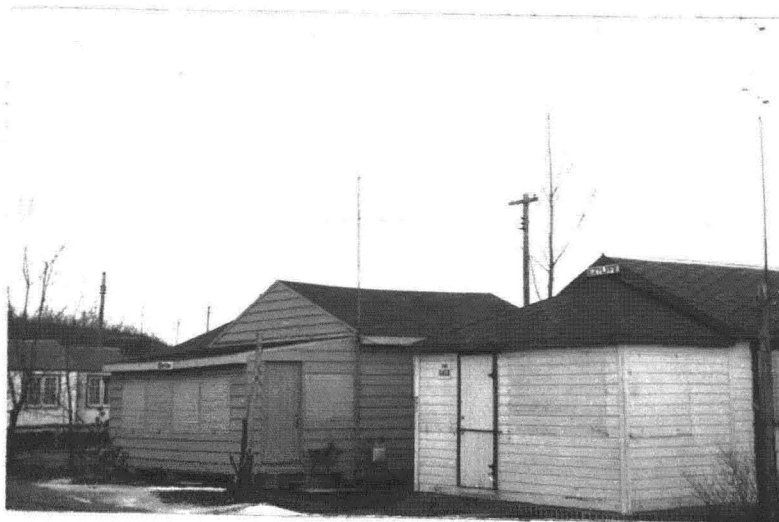
★ LIGHTHOUSE



First Class House in Straffordville



Third Class House in Port Burwell



Cottages at Port Burwell



terminate at Port Burwell. Paved roads lead east and west to Port Rowan and Port Bruce respectively.

The village is situated on a low terrace overlooking the Otter Creek to the west and Lake Erie to the south. This terrace stands 35 feet above the lake level and extends to the eastern limits of the village where it gently rises to the level of the surrounding sand plain. The harbour is located in the mouth of the Otter Creek being protected from wave action by a long breakwater. This breakwater has caused a long, wide beach to form on its western flank while a small beach has formed just east of the harbour.

The chief functions of this village are those of a trans-shipment point for coal and a fishing centre. These functions are carried on in the waterfront area. Most of the residential and commercial sections are located on the flat top of the bluff while the cottages are found mainly on the beach with only a few on the top of the bluff.

There are two industries in Port Burwell of which fishing is the more important. Because the coal yards have taken up the most desired locations near the mouth of the harbour, the fishing sheds are found in a strip along both sides of the river at the extreme north. This year over 42 boats worked out of Port Burwell. Each boat holds up to one ton of fish and makes one trip per day. All the boats are privately owned and manned by crews of five, while one man stays on shore to mend the nets. The fishing season lasts ten months of the

year with January and February reserved for repair and overhauling the boats and motors.

The greatest number of fish are caught in the spring and include mainly whitefish, perch and pickerel. In the fall herring and whitefish are the chief catch. Most of the fish are marketed through the Port Dover Fisherman's Co-Op, which has a branch in Port Burwell. The Co-Op sells the fish almost entirely to the United States. They are sent in refrigerated transport trucks to Detroit, New York and other cities.

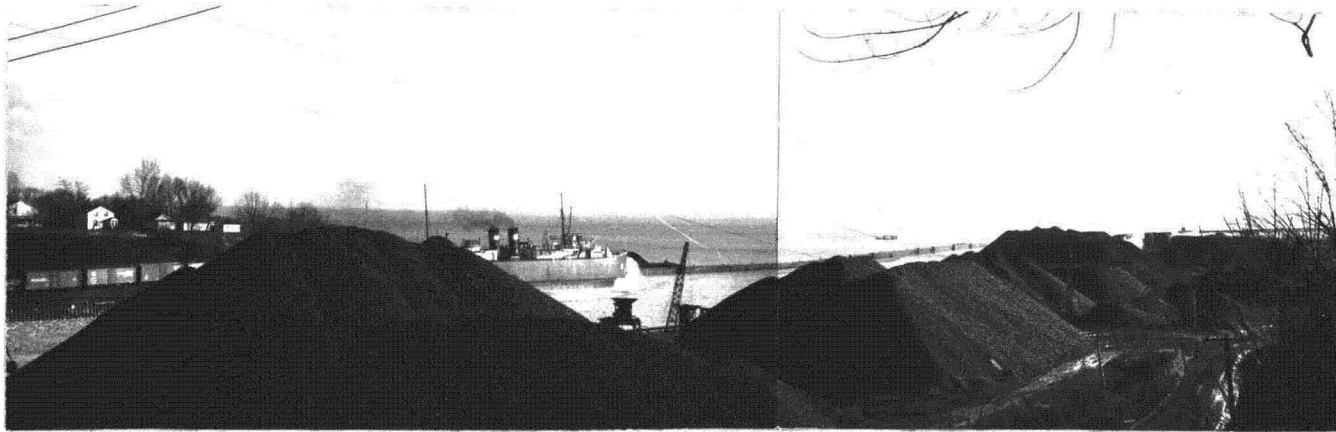
The other large industry is coal. There are three large companies which import and distribute bituminous coal and oil. The coal is transported in bulk on self-unloading boats from the United States. The coal is distributed within an area which extends west to St. Thomas, north to Stratford and east to Brantford and Simcoe. One of the companies ships 50% of the coal by train and 50% by truck. Another firm ships 100% by truck. The companies have to stock pile enough coal to last from December 5th until April 1st when shipping resumes on Lake Erie. At the present time dock facilities are all used up and no expansion seems possible.

The Canadian Pacific Railway also imports coal through Port Burwell but in loaded freight cars which are ferried daily across the lake.

In 1957 the amount of coal imported through Port Burwell was



Port Burwell - View Eastward Across the Otter Creek



Coal at Port Burwell



Fishing Boats



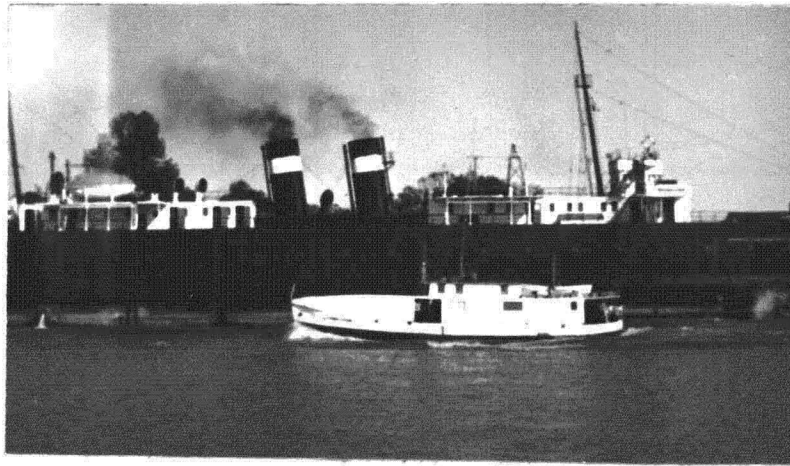
387,628 tons, while 589,649 gallons of oil were brought in by ship. There were also 63,338 tons of miscellaneous materials such as aluminum and scrap iron which were imported. Total exports were only 89,982 tons, composed mainly of pulp wood, tin scrap and aluminum scrap. This material comes from many sections of Ontario, by train and is sent to Ashtabula, U.S.A.

First class housing comprises only eleven houses in Port Burwell. They are scattered on several streets and form no zone.

Thirty-five percent of the homes are of second class and are found mainly on highway #19.

Third class housing comprises over 60% of the homes. Most of the houses on the west side of the river are shacks as illustrated in the photo on Page . The third class houses in Port Burwell proper are somewhat superior to these shacks, although there is a great concentration of very poor homes in the north central section of the town.

There are about 200 cottages, most of which lie within the village limits. Two sites are used, the beach proper and the bluff. The cottagers come from London, Woodstock, Tillsonburg and Ingersoll. The cottages on the west or "old beach" all lease their land from one owner, Mrs. Travis. The cottages on the east bank overlooking the lake are forever threatened by the receding bluff. All have at one time or another been moved back and many have been moved out of the area.



A. By Steamship



B. By Rail



C. By Truck

The retail zone is small and located near the bluff on the creek. It is made up of two small bakeries, a barber shop, a large hardware store, two grocery stores, a drug store, a shoe maker shop, a billiard hall, three small lunch bars and a radio and TV store. Their business is quite seasonal. The bank at Port Burwell remains open two days a week. It is a branch of the bank at Straffordville. The large hotel does a good business being both licensed and a cocktail lounge. This retail zone does a good business in the summer months when the population swells to over 2,000 people. A discussion of the trade area will be found later.

Recreation is of considerable importance at Port Burwell. The main attraction is the beach on the west side of the river which has developed by longshore currents and waves. A marshy section is found between the shore and bluff. This marsh is slowly diminishing. The entire beach is quite low and flat and subject to flooding in the spring. The beach is a mile and a half in length and has a maximum width of approximately one-quarter of a mile closest to the breakwater. Most of the cottages are situated on this beach and it is used mainly by the cottage residents.

In slack water immediately east of the breakwater a small beach has been built up. This beach is used mainly by those who only come for a day. There is a dance hall and several concession booths on each beach.



Large Artificial Beach West of Port Burwell,  
Built by longshore currents and waves after  
construction of breakwater.



The "New Beach" formed in slack water east of  
breakwater. Note concession booths.



There was once a High School at Port Burwell but it was closed several years ago and the students now go to Tillsonburg, at an annual cost of \$300 each to the tax-payer. There is, however, a large well-equipped public school with a staff of five, serving the village children and also those of a district including the area south of Vienna.

As for Police protection, the closest officer is at Tillsonburg. The fire truck from Straffordville will come to Port Burwell for a sum of \$25.00.

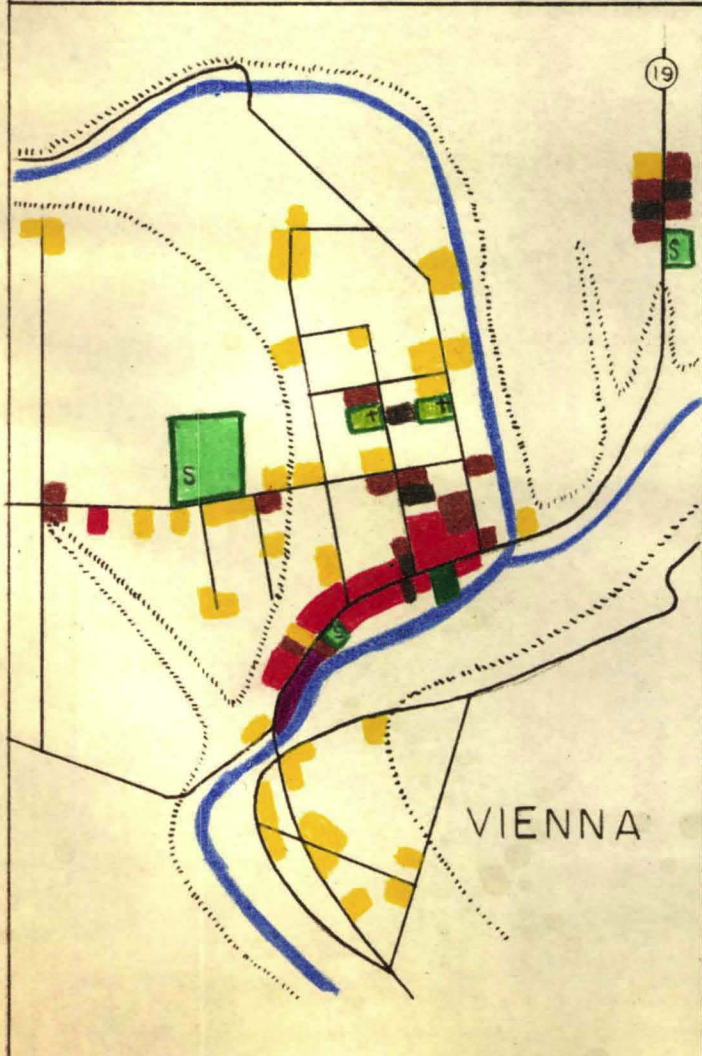
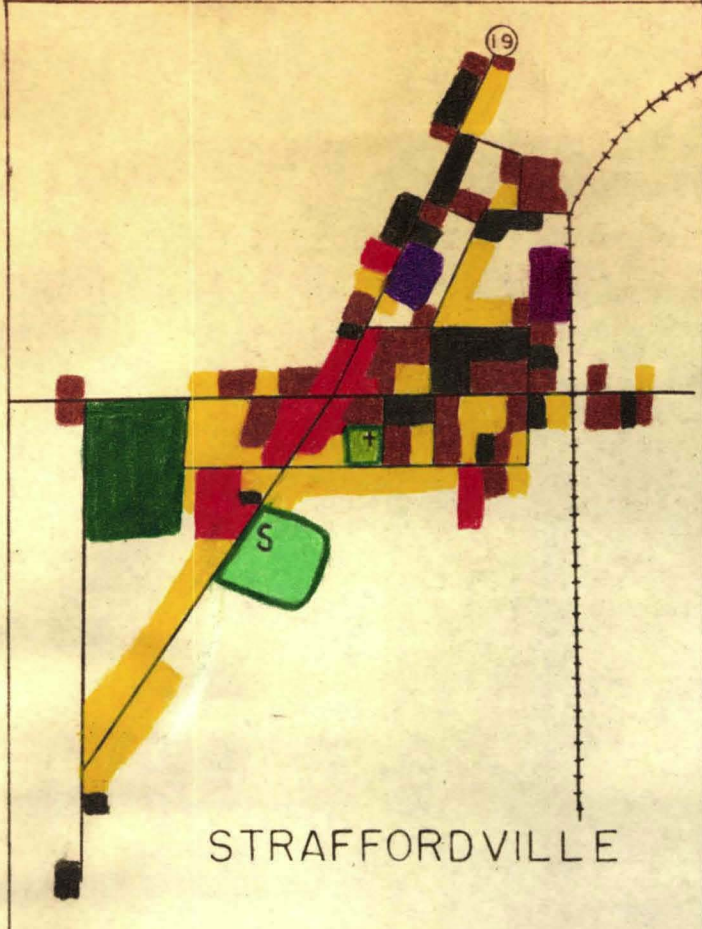
### Vienna

This small village lies three miles north of Port Burwell on the shores of the Big Otter Creek. Incorporated in 1861 with a population of 908, Vienna had only 312 inhabitants in 1957.

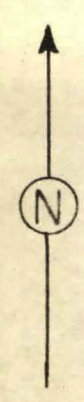
Number 19 highway runs through the village and is the only paved road in the village. The remaining streets and roads leading to the country are gravel roads, most of them being of inferior quality.

The function of Vienna is mainly the distribution of goods and services to the surrounding agricultural region.

Several quite large stores were found in the retail zone. These were a hardware and appliance store, two grocery stores, a dry goods and a frozen goods store. Smaller sized stores and shops such as a variety store, a lunch bar, a plumbing and heating store and a barber shop comprise the remainder of the retail zone. A branch bank of



- HOUSING
- FIRST CLASS
  - SECOND CLASS
  - THIRD CLASS
  - SCHOOL
  - CHURCH
  - PARK
  - RETAIL
  - INDUSTRY
  - STREAM
  - RAILWAY
  - TOWNSHIP BUILDINGS
  - BREAK IN SLOPE
  - IDLE LAND



SCALE  
5 Inches to 1 Mile



Vienna situated on the Otter Creek



Schools in Bayham are Becoming Centralized.

Straffordville remains open two days a week. There is also a large hotel which does a very flourishing business the year round as there is no other licensed hotel between Vienna and Tillsonburg, thirteen miles to the north. A small feed mill and a tractor repair centre were found in the village.

The only industry is a small sash and door factory employing less than ten people. The activities of the industry fluctuate greatly and it seems very unstable. Central Pipe Line Company has a large yard near the Creek where pipes and machinery are stored.

Very poor housing was found in Vienna. Only six first class houses were observed. The remaining were of very poor quality. Most are of frame construction, badly in need of paint and repair. The houses are scattered along the streets leaving many vacant lots.

Vienna has shown a very slight increase in population in the last few years. The tobacco boom has helped Vienna, but with greater mechanization in the tobacco industry the population of this village might easily decrease. The commercial zone is more stable as it serves the farming communities as well as the village.

#### Straffordville

The present population of this unincorporated village is 672 and it has grown rapidly in the past ten years. Since 1954, twenty-one new homes have been built, all of which are of the first and second class. Straffordville is located in the heart of Bayham tobacco district.



Highway #19 intersects the Talbot Street Road at this point. The Canadian Pacific Railway also has a siding at the edge of the village.

The site of the village is a well drained, sand plain. The commercial section stretches along Highway #19 and most of the new development is found either on this road or the Talbot Road. Straffordville's increase is due to tobacco. Many farmers have made a great deal of money in the past few years and no longer work their farms themselves but hire growers and manage their farms.

The retail zone of Straffordville is larger than those of Vienna or Port Burwell. There is a large repair centre for farm machinery, three large grocery stores, a tin shop, a lumber yard, a radio and TV repair shop, a restaurant and a butcher shop. There is also a new automobile dealer, the only one in Bayham, who serves an area with a radius of ten to fifteen miles.

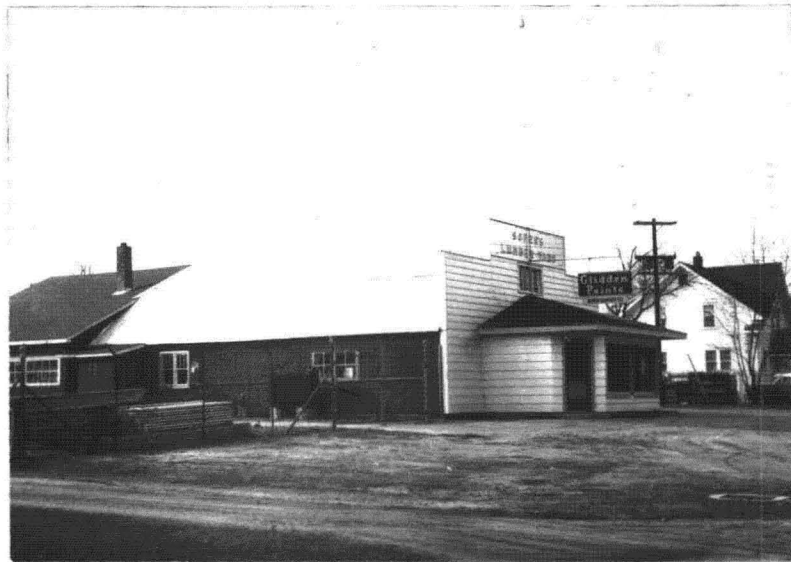
The only industry in the village is a modern packing plant operated by the Straffordville Packers. The imported cattle and hogs are sold both wholesale and retail as hams, bacon and fresh meat to the farmers and to many of the stores in Bayham as well as to other urban centres close by, including Tillsonburg.

The Straffordville bank is open each day and serves a large area in Bayham township.

This village has the only large group of first class houses



A Large Commercial Enterprise at Straffordville



Lumber Shed at Straffordville

Many of the owners are tobacco farmers who operate their farms from the village. Some are retired tobacco farmers and some are people who work in Tillsonburg.

The majority of the homes in Straffordville are of second class.

Homes of the third class can be found south of Talbot Street, along both sides of #19 highway.

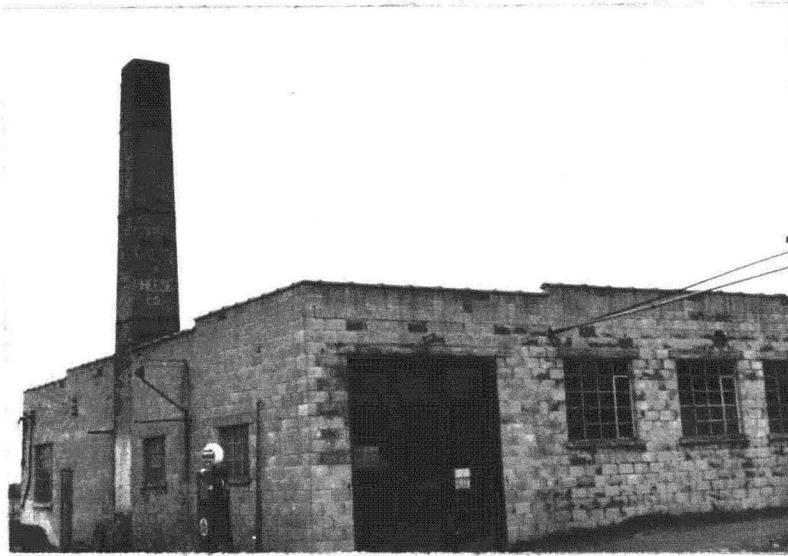
There are four remaining centres in Bayham. These are of the sixth order and include Eden, Bayham, Corinth and Calton. Of these villages the only one which is showing an increase in population is Eden. This is due mainly to its proximity to Tillsonburg and its location on #19 highway. Most of the people living here work in Tillsonburg. Some of the people in the other centres are employed seasonally in tobacco, though the bulk of the inhabitants in each village consists of retired farmers. Most of the homes are of the third class with a few second class and perhaps one or two first class homes in each centre.

A general store is found in each centre, also one church with which the community life is linked.

#### Urban Centres and Trade Areas

London, a first order centre, dominates the entire region.

The entire township is dominated by the third order centre



Cheese Factory at Corinth



The Commercial Centre of Straffordville



94.



Eden



Bayham

of Tillsonburg. With 137 stores this centre is very much larger than all the commercial areas in Bayham combined. Many of the people do much of their shopping in Tillsonburg, but in most cases the specialty shops are the main attraction. Clothing shops, theatres, and furniture stores exert the greatest influence on the township. Other commercial influences are automobiles and accessories, farm machinery, banks, insurance companies, funeral parlors and appliances.

Straffordville is a fourth order centre and serves over two-thirds of the township. The Bank at Straffordville is open each day and has a monopoly over the banking business of southern Bayham. The branches in Vienna and Port Burwell are open two days a week as they are operated by men of the Straffordville staff. The trade area of Straffordville extends a short way into the townships of Houghton and Malahide.

Vienna and Port Burwell are of the fifth order, each with a long, narrow trade area. Port Burwell's trade area is the larger of the two because of the nature of the shore. It stretches about eight or nine miles to the east and six or seven miles to the west along the lakeshore road.

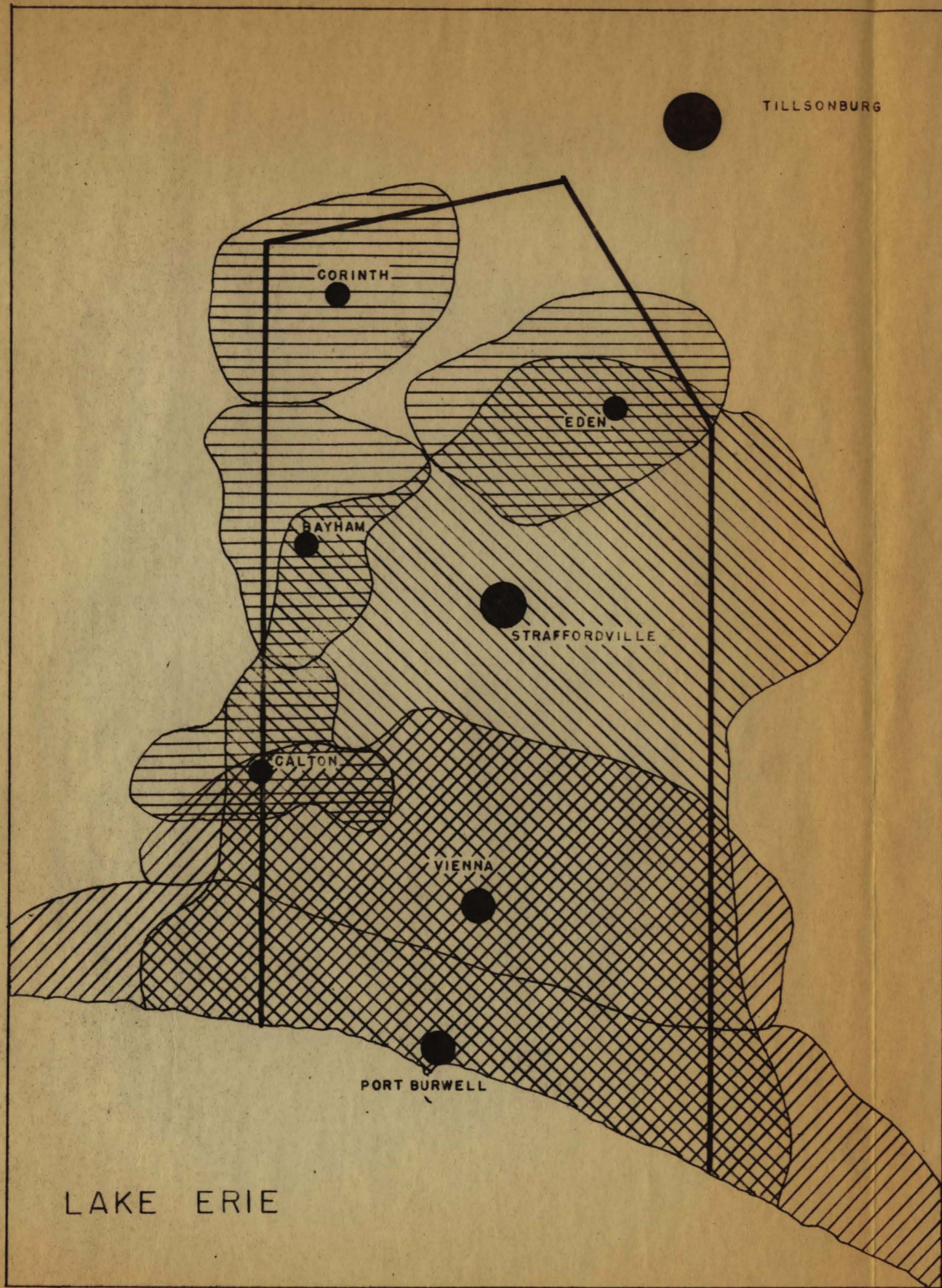
The trade area of Vienna is more restricted than that of Port Burwell. The roads leading to Vienna are poor. The trade area of Straffordville has a greater effect on Vienna than on Port Burwell.

The trade areas for Eden, Corinth, Bayham and Calton based upon the influence of the grocery store in each hamlet are roughly equal in size.



# URBAN CENTERS AND TRADE AREAS

## BAYHAM TOWNSHIP



Entire Township Dominated By  
First-Order Center Of London



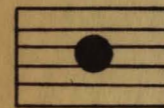
Third-Order Center  
Dominates Entire Township



Fourth-Order Commercial Center  
And Trade Area



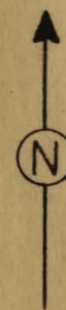
Fifth-Order Commercial Center  
And Trade Area



Sixth-Order Commercial Center  
And Trade Area

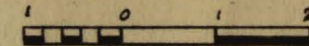


Township Boundary



SCALE

1/2 Inch to 1 Mile



LAKE ERIE



## C H A P T E R IV

### CONCLUSIONS

The land utilization pattern in Bayham township has been a result of both physical and cultural influences.

Bayham township is a farming area with four major types of agriculture. The general farming in the central region can be expected to change into a cash crop farming similar to that of the southwestern area of the township. The dairy farms, will in all probability see no change in their present use of the land. The tobacco region, will become more intensively used in the future. A straight two crop rotation with practically no exception will eventually be the land use system. Most of the marginal tobacco land will be devoted to other crops such as corn and wheat.

The urban areas have not such a bright picture. All the centres serve the agricultural regions. The latter almost reaching its maximum at the present time indicates that few of the centres will expand. The populations may increase to some extent, but this will also reach a point of equilibrium. Port Burwell has a recreational region which will become a profitable industry in the future. The number of cottages is increasing each year and with some effort the "Old Beach" could become a much larger resort centre.

## APPENDIX A

Three sets of climatic data were used in applying the  
1  
Thornthwaite system of climatic classification to Bayham Township.  
The first is for the year 1956, which was a cold year, being much below  
the average in the summer months. The second was for the year 1955, a  
hot year, with the summer months above average temperature. The last  
set of figures is the average for the period 1934 - 1957. All this  
climatic data was obtained from the Tobacco Experimental Substation  
west of Delhi, which is approximately ten miles due east of the study  
area.

Thornthwaite's method consists of determining the actual  
potential evapotranspiration and relating this to the precipitation.  
He estimated that the maximum storage capacity of the soil was 10.00  
centimeters and if potential evapotranspiration exceeds precipitation  
this soil storage will decrease. Similarly, if the opposite were  
true until it reached its maximum of 10.00 centimeters. A moisture  
deficit then can easily be calculated and similarly, a moisture  
surplus, which are used in the calculations of the Moisture Balance  
graphs. Mathematical calculations of each line in the tables are  
described. There are several objections to this method being used in  
Bayham township's sandy soils. First, the soil moisture in storage is

---

1. Thornthwaite, C. W., "An Approach toward a Rational Classification  
of Climate", The Geographical Review, 1948.

often less than 10.00 centimeters as the soils are very open and drainage in some areas excessive. Second, the runoff is calculated as being one-half of the moisture surplus, whereas in reality it varies considerably depending upon the state of the ground. In the winter-time runoff will be more than one-half, while in the spring, summer and fall this moisture surplus will all be absorbed into the soil. Third, the Thornthwaite classification is based on the ground being completely covered with vegetation, yet in tobacco fields this condition is not obtained before mid-July. But these inaccuracies, oddly enough, balance out and the method proves quite accurate. It is very valuable in the tobacco-growing sections of Bayham township, as the time and the amount of water needs may be worked out. <sup>1</sup> Ninety percent. of the tobacco farmers in Bayham have irrigation systems and are able to profit by this information.

In the application of the Thornthwaite system to irrigation, the procedure is to calculate the daily potential evapotranspiration, subtract it from the known quantity of moisture stored in the soil and add any water derived from rainfall. When the soil moisture storage value reaches zero, irrigation water should be applied in an amount varying with the soil field capacity and the depth to which the root zone of the plant has penetrated. There follows an example of the notations made in applying this method.

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1. Walker, E. K., "An Evaluation of Thornthwaite Evapotranspiration Estimates for Determining Time of Irrigation of Flue-cured Tobacco", The Lighter, Vol. 27, No.2, May, 1957.

Table 1

1

Portions of the 1954 Soil Moisture Account Cms. of Moisture

<u>Date</u>	<u>Daily Potential Evapotranspiration</u>	<u>Total Moisture</u>	<u>Soil Moisture Storage Value</u>	<u>Rainfall</u>
May 12	0.134	10.000	10.000	
May 13	0.170	9.866	9.866	
May 14	0.206	9.696	9.696	
May 15	0.257	9.490	9.490	
July 8	0.249	0.703	0.703	
July 9	0.277	0.454	0.454	
July 10	0.318	2.463	0.177	2.286*
July 11	0.367	2.145	2.145	
July 24	0.358	0.654	0.654	
July 25	0.368	2.582	2.296	2.286*
July 26	0.410	2.214	2.214	
July 27	0.439	1.804	1.804	

\* (irrigation)

Over the past ten years it has been found that much higher and better yields are obtained if the tobacco is irrigated in times of drought. At first irrigation times and amounts were approximated by eye and using moisture blocks, but recent experiments at the Tobacco Experimental Substation have given an indication that the Thornthwaite system is superior. The results, in terms of the quality of tobacco obtained when the Thornthwaite system of irrigation is used are similar to those obtained when the moisture block system is applied. However,



the yield in pounds per acre has increased about 5% under the Thornthwaite system and the returns in dollars per acre, by about 1%.

The moisture balance for the two years, 1955 and 1956, was calculated to show the climatic extremes which occur in this area. In 1955 the aridity index was 16.9, showing a moderate summer water deficiency, while the 1956 figure was 3.5, indicating little or no water deficiency. This difference was clearly reflected in the amount of irrigation water needed. In 1955 most farmers irrigated three times, July 7, July 14 and August 4; while in 1956 one irrigation was sufficient, this coming on July 30. The two moisture balance graphs clearly show water need at the irrigated times. The amount of water used on Bayham township soils for each irrigation will be one inch, this amount representing the moisture holding capacity of the top foot of the average Plainfield sand.

The use of long term weather data for calculating irrigation time would appear to be satisfactory in many years, but of questionable value when temperatures vary considerably from the long term average as they did in 1955 and 1956.

1955

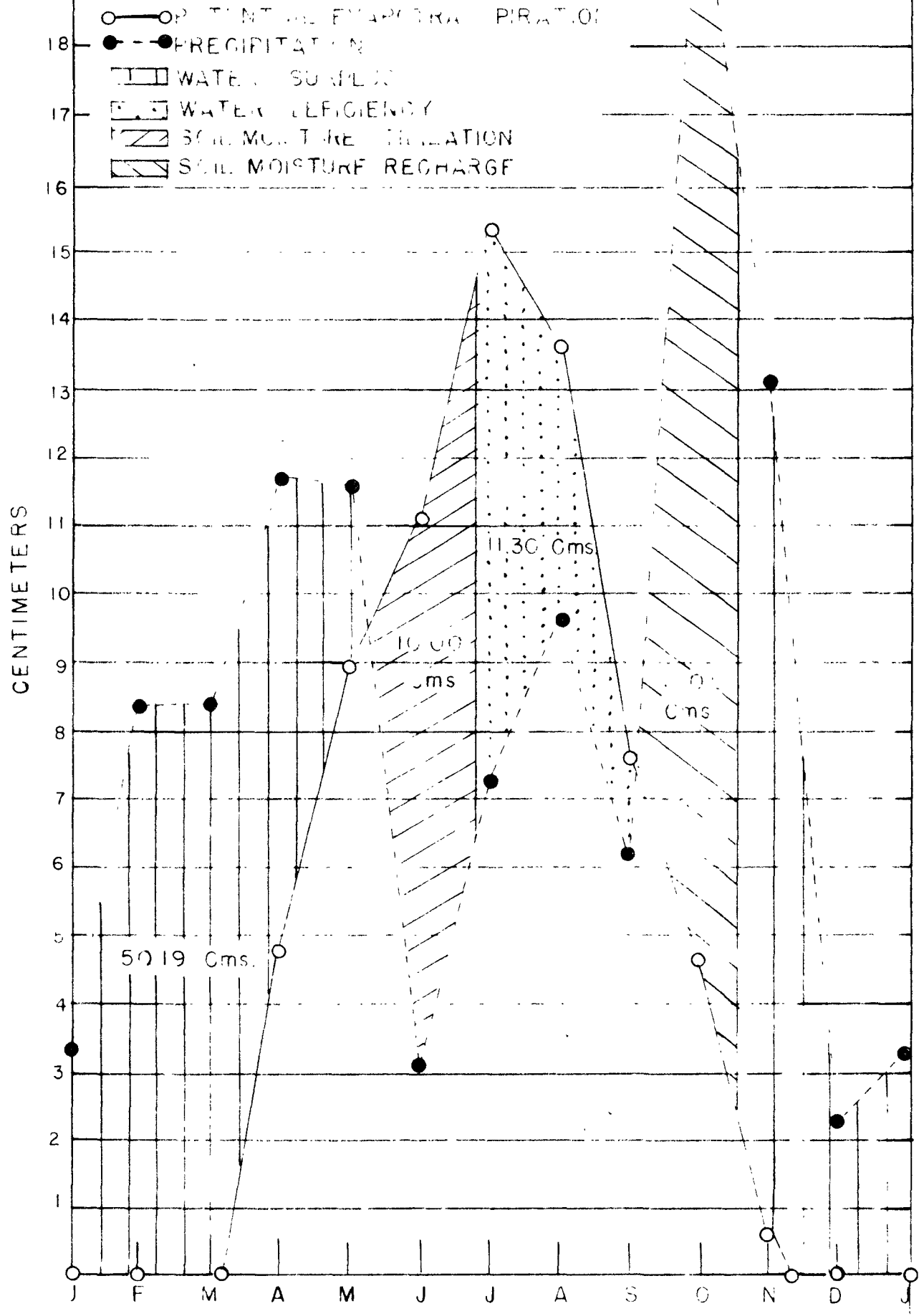
## BAYHAM TOWNSHIP COMPUTED BY THORNTHWAITE'S 1948 SYSTEM

Type - B<sub>3</sub> B'<sub>1</sub> sb'<sub>2</sub>

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean Monthly Temp. °C	-5.1	-3.7	0.3	10.2	15.3	18.2	23.9	22.8	15.8	11.1	2.4	4.1	
Heat Index	45.47	-	-	.01	2.94	5.44	7.07	10.68	9.95	5.71	3.34	.33	-
Unadjusted Potential Evapotranspiration, Cms.	-	-	-	4.3	7.1	8.7	12.0	11.4	7.3	4.8	0.8	-	
Latitude & Month Correction Factor	.82	.83	1.03	1.12	1.26	1.27	1.28	1.19	1.04	.95	.82	.79	
Potential Evapotranspiration, Cms.	-	-	-	4.82	8.95	11.05	15.36	13.56	7.59	4.56	.66	-	66.55
Precipitation (Ins. 41.15 Cms. 104.52)	3.35	8.43	8.47	11.68	11.58	3.12	7.37	9.57	6.20	20.29	13.03	2.41	
Precipitation Minus Potential Evap., Cms.	3.35	8.43	8.47	6.86	2.63	-7.93	-7.99	-3.99	-1.39	15.73	12.37	2.41	
Soil Moisture in Storage Cms.	10.00	10.00	10.00	10.00	10.00	2.07	-	-	-	10.00	10.00	10.00	
Storage Change Cms.	-	-	-	-	-	-7.93	-2.07	-	-	10.00	-	-	
Actual Evapotranspiration Cms.	-	-	-	4.82	8.95	11.05	9.44	9.57	6.20	4.56	.66	-	65.35
Moisture Deficit Cms.	-	-	-	-	-	-	-5.92	-3.99	-1.39	-	-	-	11.30
Moisture Surplus Cms.	3.35	8.43	8.47	6.86	2.63	-	-	-	-	5.73	12.31	2.41	50.19
Runoff Cms.	2.87	5.88	8.44	7.66	4.75	1.32	-	-	-	2.86	9.01	7.35	
Moisture Index 65.2	Thermal efficiency index 66.55				Index of Aridity 16.9				Type s				
Climatic type B <sub>3</sub>	Climate type B' <sub>1</sub>				Index of Humidity -				Type -				
Annual PE 66.55	June-July-August 39.97 Cms.				Summer Concentration 60%				Type b' <sub>2</sub>				

# MOISTURE BALANCE

## 1955 BAYHAM TOWNSHIP



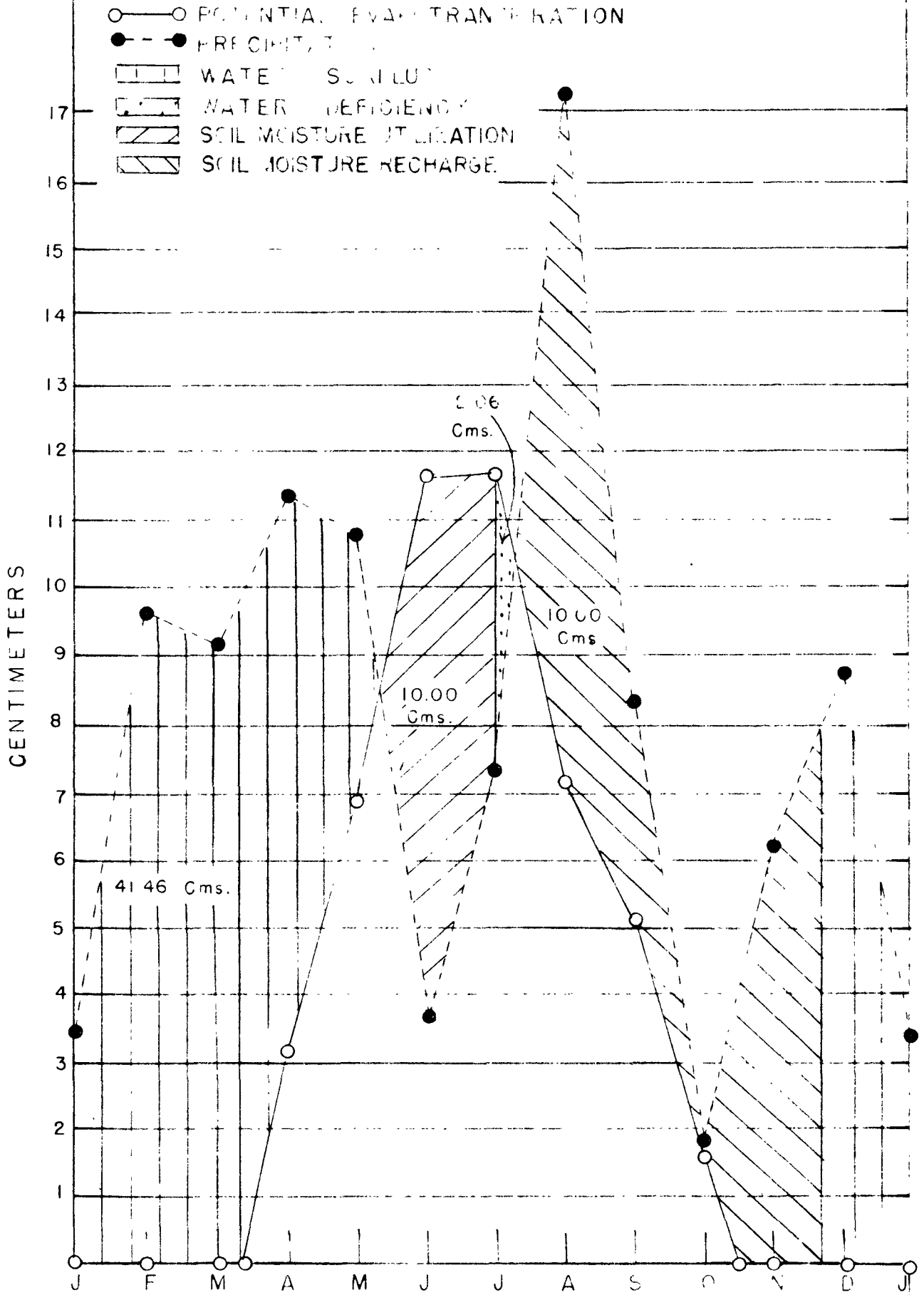
1956

BAYHAM TOWNSHIP COMPUTED BY THORNTHWALTE'S 1948 SYSTEM

Type - B<sub>3</sub> B'<sub>1</sub> rb'<sub>2</sub>

	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean Monthly Temp. °C	-5.0	-4.2	-1.9	5.9	11.3	18.3	17.7	19.7	13.7	11.0	4.2	4.2	-0.2
Heat Index 36.57	-	-	-	1.29	3.44	7.13	7.97	7.97	4.70	3.30	.77	-	
Unadjusted Potential Evapotranspiration, Cms.	-	-	-	2.7	5.4	9.2	8.8	9.8	6.8	5.3	1.9	-	
Latitude & Month Correction Factor	.82	.83	1.03	1.12	1.26	1.27	1.28	1.19	1.04	.95	.82	.79	
Potential Evapotranspiration, Cms.	-	-	-	3.02	6.80	11.68	11.26	11.66	7.07	5.04	1.56	-	5809
Precipitation (Ins. 38.44 Cms. 97.56)	3.48	9.57	9.17	11.43	10.74	3.56	7.32	17.20	8.31	1.85	6.17	8.69	
Precipitation Minus Potential Evap., Cms.	3.48	9.57	9.17	8.41	3.94	-8.12	-3.94	5.54	1.24	-3.19	4.61	8.69	
Soil Moisture in Storage Cms.	10.00	10.00	10.00	10.00	10.00	1.88	-	5.54	6.78	3.59	8.20	10.00	
Storage Change Cms.	-	-	-	-	-	-8.12	-1.88	5.54	1.24	-3.19	4.61	1.80	
Actual Evapotranspiration Cms. 56.03	-	-	-	3.02	6.80	11.68	9.20	11.66	7.07	5.04	1.56	-	5603
Moisture Deficit Cms. 2.06	-	-	-	-	-	-	2.06	-	-	-	-	-	2.06
Moisture Surplus Cms. 41.46	3.48	9.57	9.17	8.41	3.94	-	-	-	-	-	-	-	6.89
Runoff Cms.	5.18	6.52	9.36	8.79	6.18	1.97	-	-	-	-	-	-	3.44
Moisture Index 69.2	Thermal efficiency index 58.09		Index of Aridity 3.5		Type r								
Climatic Type B <sub>3</sub>	Climatic type B' <sub>1</sub>		Index of Humidity -		Type -								
Annual PE 58.09	June-July-August 34.60		Summer Concentration 60%		Type b' <sub>2</sub>								

# MOISTURE BALANCE 1956 BAYHAM TOWNSHIP



Average

## BAYHAM TOWNSHIP COMPUTED BY THORNTHWAITTE'S 1948 SYSTEM

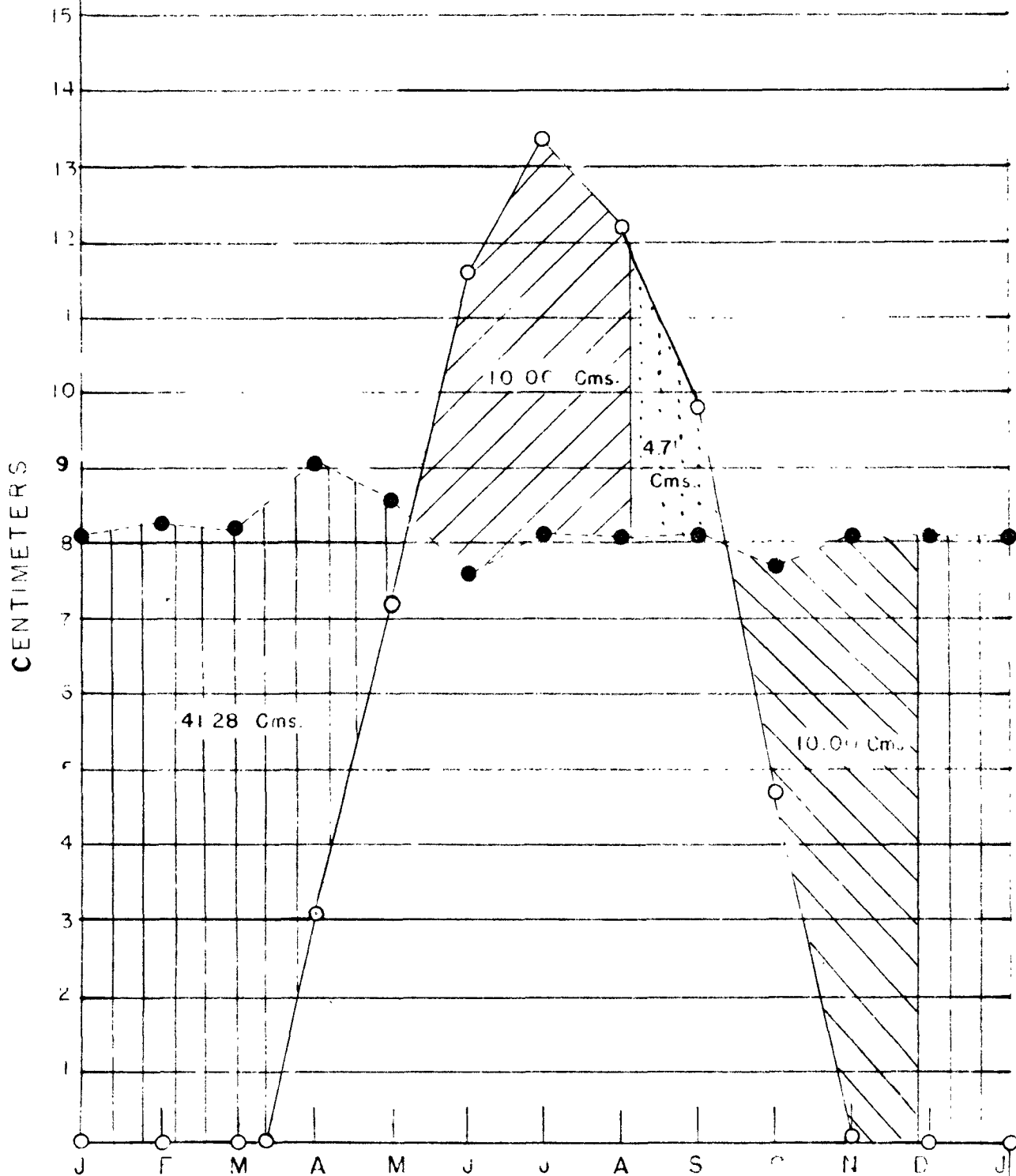
Type B<sub>3</sub> B' rb'<sub>2</sub>

	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean Monthly Temp. °C	-5.0	-4.4	0.1	6.4	12.7	18.7	21.1	20.3	19.2	10.3	0.8	-2.5	
Heat Index 40.82	-	-	-	1.45	4.10	7.37	8.85	8.34	7.67	2.99	.06	-	
Unadjusted Potential Evapotranspiration, Cms.	-	-	-	2.7	5.8	9.1	10.5	10.2	9.4	4.6	0.3	-	
Latitude & Month Correction Factor	.82	.83	1.03	1.12	1.26	1.27	1.28	1.19	1.04	.95	.82	.79	
Potential Evapotranspiration, Cms.	-	-	-	3.02	7.28	11.55	13.44	12.14	9.77	4.62	.25	-	6207
Precipitation (Ins. 38.03 Cms. 98.64)	8.03	8.38	8.36	9.09	8.56	7.52	8.36	8.03	8.28	7.70	8.18	8.15	
Precipitation Minus Potential Evap., Cms.	8.03	8.38	8.36	6.07	1.28	-4.03	-5.08	-4.11	-1.49	3.08	7.93	8.15	
Soil Moisture in Storage Cms.	10.00	10.00	10.00	10.00	10.00	5.97	.89	-	-	3.08	10.00	10.00	
Storage Change Cms.	-	-	-	-	-	-4.03	-5.08	-.89	-	3.08	7.92	-	57.3
Actual Evapotranspiration Cms.	-	-	-	3.02	7.28	11.55	13.44	8.92	8.28	4.62	.25	-	5736
Moisture Deficit Cms.	-	-	-	-	-	-	-	3.22	1.49	-	-	-	4.71
Moisture Surplus Cms.	8.03	8.38	8.36	6.07	1.28	-	-	-	-	-	1.01	8.15	128
Runoff Cms.	8.09	8.31	8.37	7.32	3.68	.64	-	-	-	-	.50	4.57	
Moisture Index 61.8	Thermal efficiency index 62.07		Index of Aridity 7.5				Type r						
Climatic Type B <sub>3</sub>	Climatic Type B'		Index of Humidity				Type						
Annual PE 62.07	June-July-August 37.13		Summer Concentration 59.8%				Type b' <sub>2</sub>						

# MOISTURE BALANCE

## AVERAGE 1935-1957 BAYHAM TOWNSHIP

- POTENTIAL EVAPOTRANSPIRATION
- PRECIPITATION
- WATER SURPLUS
- ▨ WATER DEFICIENCY
- ▧ SOIL MOISTURE UTILIZATION
- ▩ SOIL MOISTURE RECHARGE



## APPENDIX B

The Ontario Flue-Cured Tobacco Growers Marketing Board(a) Marketing Board Rights

A farmer must have two acres of tobacco land for one acre of rights. He must have one kiln erected for the first six acres of rights and a kiln erected for every five acres of rights thereafter. A man with thirty-two acres rights, for example, must have sixty-four acres of tobacco land plus six kilns. Tobacco land is defined as cleared land that has grown or could grow good tobacco. These rights are measured each year and the farmer must obey his rights or the marketing board will direct him to cut down any tobacco planted in excess of his rights. If he refuses to do so, he is put on the "black list" and must sell his tobacco after all the other tobacco has been bought. Until this year it was very difficult to obtain rights; they were only given out in certain years and to a certain number of people.

It can be seen that the number of acres of rights on a farm affected its real value a great deal and also influenced the land use of each farmer.

(b) Marketing System

Under the old system of marketing the licensed companies sent buyers to the farms to purchase the tobacco. In 1957 the farmers voted to establish a new marketing system under which the tobacco is sold by public auction. Now for the first time since 1935, companies other than Canadian may obtain a license to buy tobacco.



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