South Grimsby Township

- A Geographical Study

by

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L. G. Reeder

PREFACE

The field work for this thesis was carried out by the author during the late summer and early autumn of 1958.

I wish to thank Mr. A.B. Olding of the Department of Soils, Ontario Agricultural College, Guelph, Ontario, who supplied so willingly his invaluable information on the soils of Lincoln County.

I also wish to thank Dr. H.A. Wood of the Department of Geography, McMaster University, who contributed much valuable assistance in the field work.

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INTRODUCTION

The prime purpose of a geographical thesis is to present and attempt to prove a point of view that will lead to our understanding of the areal distribution of phenomena on various units of the earth's surface. An examination of a small political unit like a township reveals some of the significant problems in man's environment, which are often overlooked. It is the solution of these significant problems which enables man to live in complete harmony with his surroundings.

South Grimsby township, situated in a near central position within the Niagara peninsula, as shown in Fig. 1, lies off one of the heaviest travelled natural corridors of transportation on the North American continent. This irregularly shaped township, which occupies approximately thirty-two square miles, is bordered by six other townships, North Grimsby on the north, Clinton on the east, Caistor and Gainsborough on the south, and Saltfleet and Binbrook on the west.

The township has one of the lowest densities of population in the Niagara peninsula, even though large urban centres flourish nearby and even though it is traversed by a heavily travelled east-west highway. Furthermore, the rural areas of the township are actually losing population at the present time and few of the people have moved to any of the township's urban centres.

It is the fundamental purpose of this thesis to discover why South Grimsby township is losing population at the present time and to analyze this effect upon the physical and human environment with which it is intimately connected.

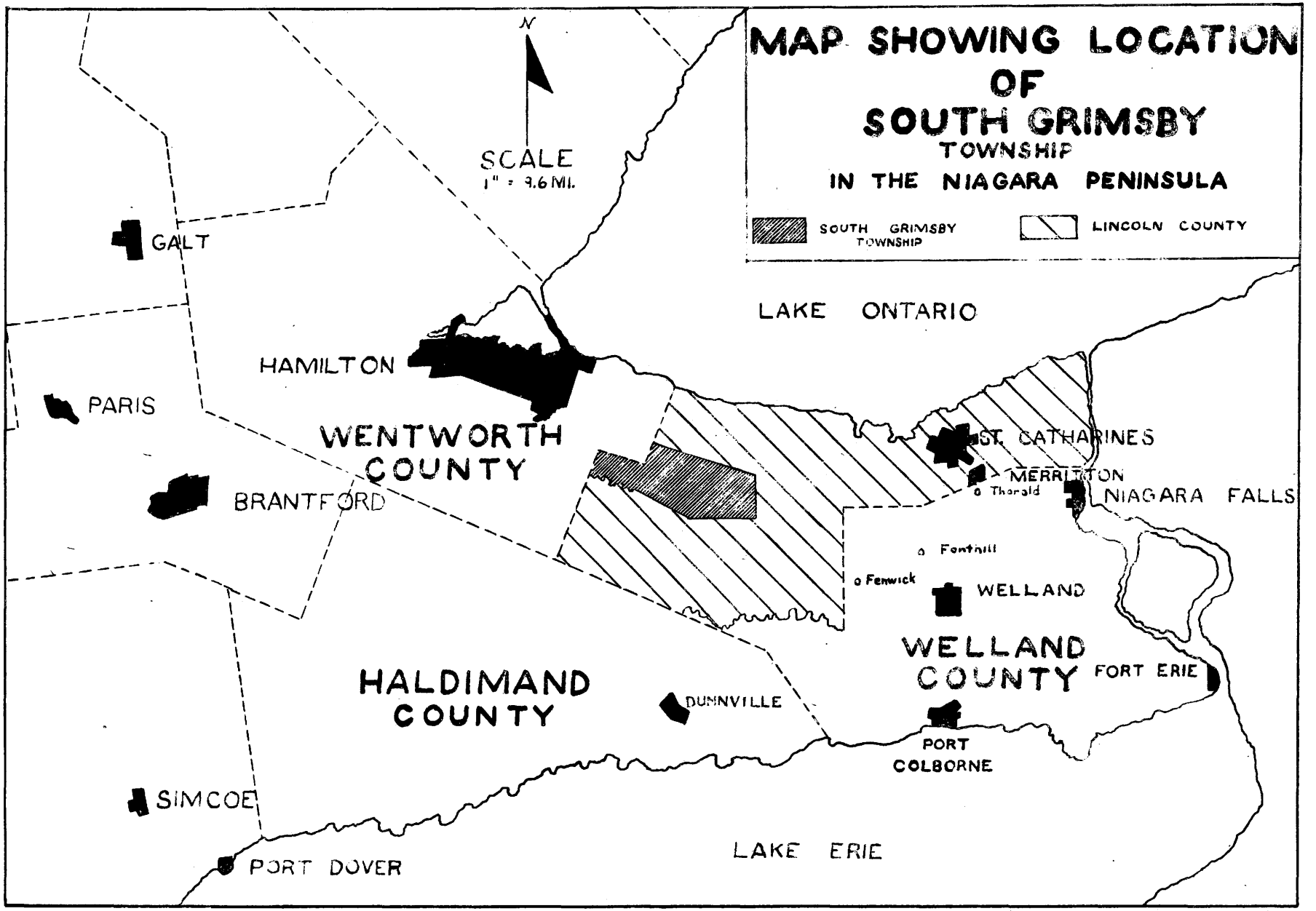
MAP SHOWING LOCATION
OF
SOUTH GRIMSBY
TOWNSHIP
IN THE NIAGARA PENINSULA
SOUTH GRIMSBY TOWNSHIP
LINCOLN COUNTY
N
SCALE
1" = 3.6 MI.
GALT
HAMILTON
PARIS
WENTWORTH COUNTY
BRANTFORD
LAKE ONTARIO
ST. CATHARINES
MERRITTON
Thorold
NIAGARA FALLS
Fonthill
Fenwick
WELLAND
WELLAND COUNTY
FORT ERIE
HALDIMAND COUNTY
DUNNVILLE
PORT COLBORNE
SIMCOE
PORT DOVER
LAKE ERIE

FIG. 1

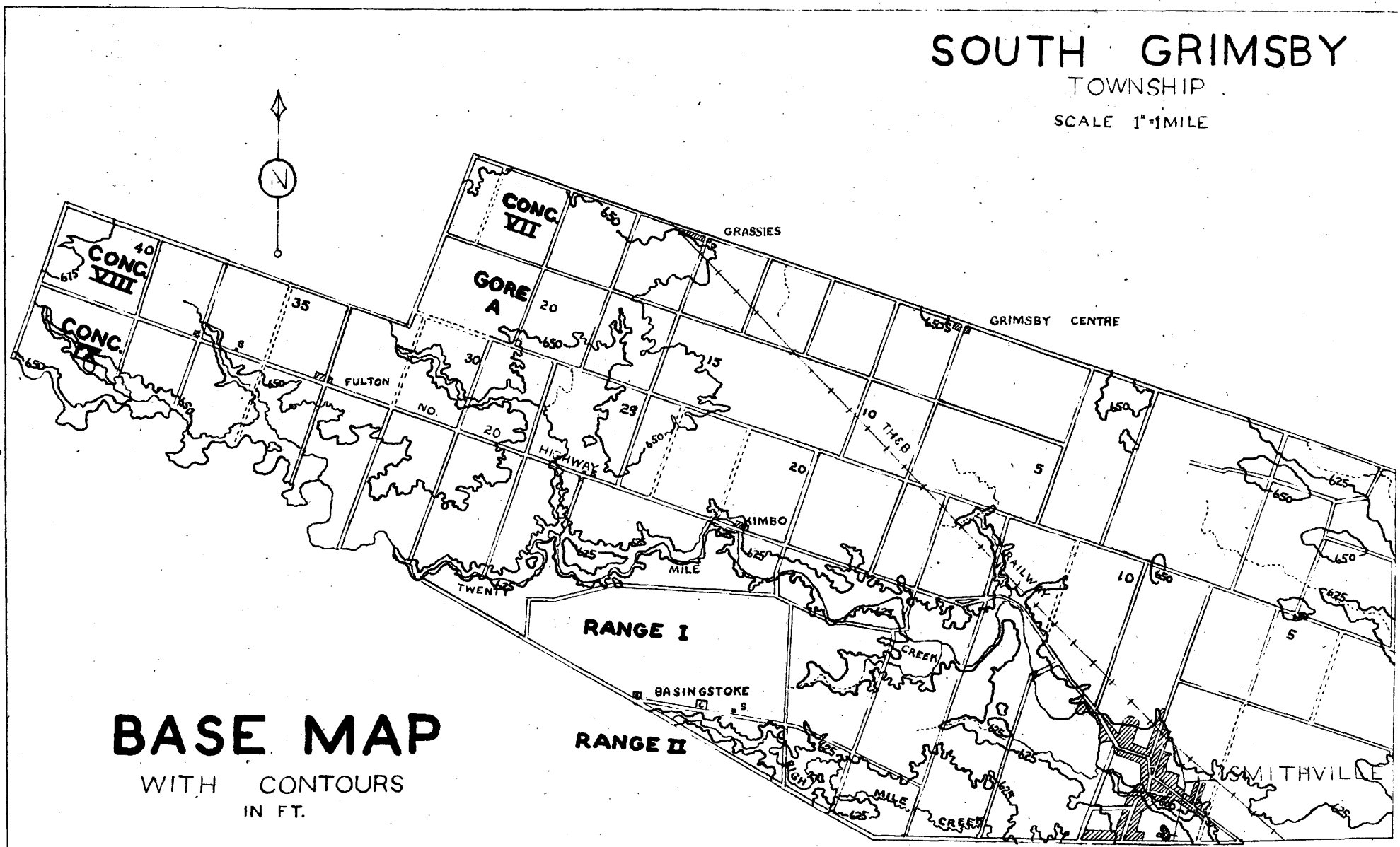
SOUTH GRIMSBY
TOWNSHIP
SCALE 1"=1MILE
CONC VII
CONC VIII
CONC IX
GORE A
GRASSIES
GRIMSBY CENTRE
FULTON
NO. 20
HIGHWAY
TWENTY MILE CREEK
KIMBO
RANGE I
RANGE II
BASINGSTOKE
SMITHVILLE
RAILWAY
THEB
BASE MAP
WITH CONTOURS
IN FT.

FIG. 2

CHAPTER I - THE PHYSICAL ENVIRONMENT

South Grimsby township exhibits no prominent topographic features. The relief of the township is gentle, varying in elevation from about 600' to 675' above sea level. There is extensive undulation south of the Twenty Mile Creek in the township and some undulation in the northeast section, but in the latter section this occurs to a lesser extent. A few small depressional basins pocket the level and gently sloping sections.

The present landscape has been shaped more or less by many physical elements, which will be discussed under the following subheadings.

1. Bedrock Structure

During the geologic past, only two great transgressions of prehistoric seas have occurred in South Grimsby township. These occurred during the Ordovician and Silurian epochs, though only two Silurian formations still remain within the township.

A large marine delta, the Queenston delta, was deposited westward from the rising mountain system of Appalachia during the first half of the Ordovician period. As erosion increased in the mountain system, the shoreline extended gradually westward until a low deltaic plain stretched from the foothills to beyond the region of Niagara[1]. The gradual thinning of the delta toward the west during this period may have been partially responsible for the southwest slope of the later deposited Silurian beds, but the fact that isostatic settling took place in this southwest direction because of differential erosion seems to be the better favoured reason for the dipping. This southwest dip of the Silurian beds is well marked at the geologic cut at Smithville, as shown in Illus. 1.

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[1] Dunbar C.O. Historical Geology. John Wiley and Sons Inc., New York, 1949. P. 167-168

Illus. 1. Geologic cut at Smithville. The Guelph dolomite with its extreme vugginess in the upper two feet of the dipping strata is easily distinguished from the harder, more massive, less vugged Lockport dolomite below it. Note the 12" ruler near the upper left-hand corner of the bedrock.

Illus. 2. Wet sloughs or upvale ponds, as they are popularly known, are evidence of the poor drainage in the level clay plain.

While the Queenston shales represent mud deposition washed in large quantities into the shallow seas, directly overlying this formation lie Silurian dolomites denoting deep sea deposition. The mid-Silurian beds, the Lockport and Guelph formations are the only bedrock members exposed in the township. The Lockport formation occupies nearly all of the township north of the Twenty Mile Creek except for a small section just west of Smithville.

These beds, as can be seen at the Smithville cut, are a brownish, thick-bedded, finely granular dolomite dotted with small vugs filled with white gypsum, the beds averaging 6-1/2' in thickness[2]. Thin, black bituminous streaks appear within a hard, massive, brownish dolomite in the next lower two and one-half foot section[3]. Over the nine foot Lockport section south of the Twenty Mile Creek lies two feet of the Guelph beds. The northern limit of the Guelph formation runs parallel to the Twenty Mile Creek, forming the southern boundary of the valley except where the Guelph formation extends north of the creek at Smithville for a short distance. The Guelph formation is a hard, brownish-grey, vuggy finely granular and sandy appearing dolomite[4]. Some lead pockets are also evident in the bedrock. Since it has a high magnesium carbonate content, large vugs have been created within the rock structure as continuous chemical weathering has removed the magnesium compound. As a result, the Guelph formation has been the more severely eroded Silurian bed. The bedrock has broken down as chemical weathering has advanced southward. A slight buried escarpment has been found at the Guelph formation's northern contact with the Twenty Mile Creek.

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[2]Caley J.R. Paleozoic Geology of the Toronto-Hamilton Area, Ontario. Geologic Survey, Memoir 224. 1940. P. 59

[3]Caley J.F. ibid. P. 72

[4]Caley J.F. ibid. P. 59

2. Physiography

The physiographic features in the township, which largely conceal its geologic structure, were developed mainly during and immediately after the recent Wisconsin glaciation. Two ice lobes, one from the north moving through the Lake Huron-Georgian Bay basins and another from the east moving through the Lake Ontario basin joined in the south of peninsular Ontario. South Grimsby township was covered by the latter ice lobe in ice hundreds of feet thick. The two ice lobes finally became engulfed in the main glacial body which eventually moved south toward its most southern extremity near the junction of the Mississippi and Ohio rivers[5].

The slow recession of these above-mentioned ice lobes produced in succession, besides many glacial deposition features, a number of pro-glacial lakes. One of the late stage pro-glacial lakes, Lake Warren, produced much of the present physiographic landscape of South Grimsby township, which is shown in Fig. 3. Lake Warren was a large glacial lake centred around the location of its present remnant Lake Erie. It was much larger and extended at its greatest size well north of the present borders of Lake Erie.

While the dying glacier withdrew eastward up the Lake Ontario basin, the fast rising meltwaters of Lake Warren reworked many of the clay particles into a thick bed as the waves rolled into the snout of the glacier. The larger sized particles were carried out into the lake. The clay particles, which were derived from the process of pulverizing local limestones and dolomites into rock flour during glacial scouring, were rewashed constantly by wave action. The final settling of these colloid particles produced a clay plain variable in thickness. The greatest depth of this unvarved glacio-lacustrine deposit

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[5]Dunbar C.O. ob. cit. P. 439-440

SOUTH GRIMSBY
TOWNSHIP

SCALE 1" = 1 MILE

PHYSIOGRAPHY MAP

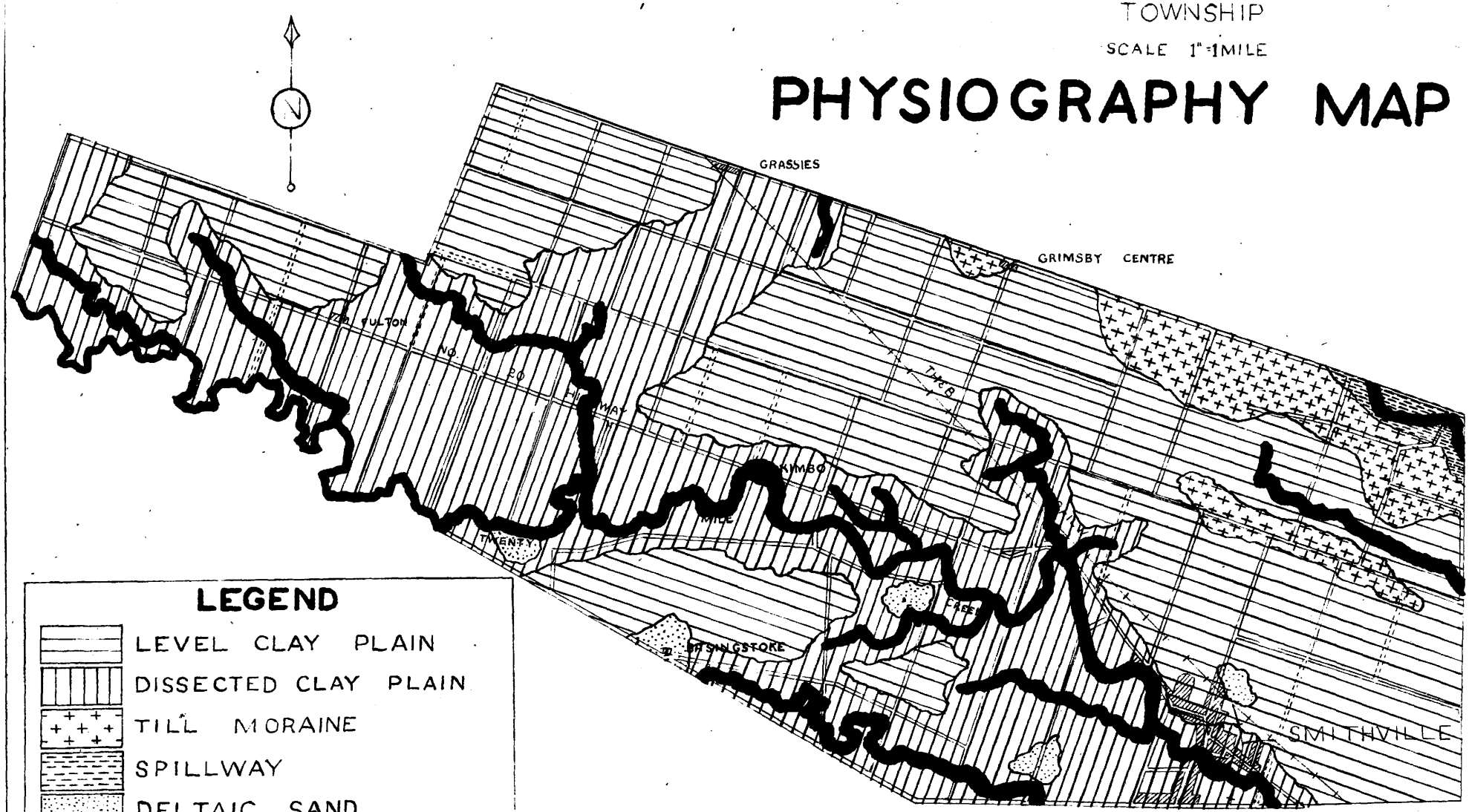

FIG. 3

occurs in the southern part of the township because in the north there was more erosion by the glacial meltwater during its flushing away from the glacier. This action helped to carry away some of the clay particles and the depth to bedrock is thinner here as a result. Exposures along the Twenty Mile Creek consistently show clay strata within a few feet of the surface, overlain by a thin sheet of till and then covered by more stratified clay. The lower layer of clay strata is crumpled, which indicates overriding by the glacier. Aerial photographs of the area show "marblings", which are characteristic light and dark markings usually associated with heavy clay.

The poor drainage in the clay plain has evidence shown for it in the many undrained depressions remaining on the level sections. These upvale ponds or wet sloughs, as they are sometimes called, may be seen on the level clay plain as shown in Illus. 2.

In the northeastern part of the township, a section of the Niagara Falls end moraine, formed by the glacier as it moved northward out of the township, is barely exposed above the surrounding terrain because of its burial within deep clay overburden. The end moraine itself can be certainly classified as a dump moraine because it was formed while the glacier was receding up the Lake Ontario basin. One strand of the dump moraine lies to the south, as shown in Fig. 3, while another lies to the west. Moraines of this type are seldom continuous for great distances; segmentation results from breaks being made through them by drainage outlets, a shift in position of the ice front or local scarcity of debris in the glacier. It is doubtful whether there was much debris in the glacier as it withdrew through the township because of the lack of a great amount of glacial material. This glacial ridge which seldom exceeds fifteen feet in height above the surrounding terrain, was built underwater at the margin of the glacier during a seasonal transgression and its

elevation was greatly reduced by wave action. The evidence for this can be seen in the content of the glacial material because a large amount of clay is mixed with the till.

There is an exposure of boulder clay beneath the deep lacustrine clay overlay at a section of the Eight Mile Creek, and it is quite possible that a ground moraine may have been present before the clay plain in the township. The fast rising meltwaters of Lake Warren could have reworked this feature, first carrying the smaller particles away and then as the water deepened recovering it with clay. Since the till is reworked, it may have once been part of the Niagara Falls moraine to the north, which was washed into Lake Warren by the rising glacial meltwater.

A section of a spillway, which once carried glacial meltwater along the receding front of the glacier, crosses the northeast corner of the township. This old meltwater channel is presently occupied by a stream,which drained, as it does now, in a east southeast direction. It was formed at the same time or shortly after the formation of the end moraine by the flow-off of water between the ice front and the moraine. It emptied into Lake Warren,which lay directly to the south. The meltwater flowing along the spillway at first was more active erosionally than depositionally, and most of the finer particles were carried away toward the pro-glacial lake, leaving an area of shallow drift over bedrock. Fine clay particles were then washed into the spillway when the level of Lake Warren rose as the ice withdrew to a new position just south of the escarpment. There was, however, not a thick enough overlay to prevent Lockport dolomite from being exposed above the drift.

As the ice finally withdrew eastward and the pro-glacial Lake Warren shrunk southward toward the present boundary of its remnant, Lake Erie, deltaic sand pockets were left exposed in the south of the township by the receding

water. It is quite possible that the outlying sand pockets could have been deposited by the Twenty Mile Creek during its early stages of meandering over the clay plain. Most of this deltaic sand has been washed into the drainage system by the tributaries of the Twenty Mile Creek,which have also dissected the clay plain in the south. Thin veneers of sand still exist, as shown in Fig. 3.

3. Climate

Climate is one of the major physical factors governing the development of soils from rock materials. It also determines, to a large extent, the crops which can be grown in any area.

South Grimsby township lies in a humid microthermal climatic zone.

In winter, the cyclonic stormy belt exerts its greatest influence on the climate. These cyclonic winds are forced southward by the Polar Continental Anticyclone which reaches the township's latitude usually by late October or early November. These winds shift direction as the anticyclone moves its frontal edge back and forth. As these cyclonic storms move through the township, precipitation is brought in varying amounts depending on the relative strength and directions of the winds. The near central position of the township between Lake Ontario and Lake Erie helps to moderate extreme temperatures in winter. As a result,winter temperatures are a few degrees higher than in the interior of the Ontario peninsula.

During the summer when the anticyclone has withdrawn northward and cyclonic storms are at a minimum, the township becomes more subject to convectional showers and the Maritime Tropical air mass. Extreme hot summers are rare as the Tropical Maritime air mass from the Gulf of Mexico assists in moderating the climate. These winds are very warm and moist and move upward when they clash with the cooler Polar Maritime air mass which moves in from

the Atlantic Ocean occasionally, and sometimes with the cooler Polar Continental air mass on the continent. Thus precipitation is very uniform all year around because of the influence of air masses.

There is no weather station within South Grimsby township, but the author has averaged statistics available for this general area. Relief has been used as the climatic basis for the calculation of the moderating influence of the lakes in the figures of the climatic table. (See Appendix A).

According to Putnam and Chapman, South Grimsby township lies in the Lake Erie counties climatic belt. Although the township is much nearer to Lake Ontario than Lake Erie, the Niagara escarpment towards the north acts as a barrier to the moderating influence of Lake Ontario. The prevailing winds, which are stronger from the west and the south, have also helped the influence of Lake Erie. A slight moderation of temperature is felt in the two northern concessions of the township on certain occasions as the northern boundary is only three miles south of the escarpment. South of the Niagara cuesta, the terrain slopes gently toward Lake Erie, and due to this fact, there is a strengthening of the southern lake's climatic influence.

In this climatic belt, there is uniform rainfall but the rainfall is less effective in summer because of increased evapotranspiration. As a result, this climatic factor has a decided influence on agriculture because many crops lack the water needed during this period of the final stages of growth. There is a water surplus in the other seasons because of increased cyclonic activity, but its value for growth is felt only before the onset of below freezing temperatures and after their departure. The climatic statistics are summarized in the following table.

Climatic Table[6].

Altitude	600' - 675'
Mean Annual Temperature	46°F

[6]Putnam D.F. and Chapman L.J. The Climate of Southern Ontario. Scientific Agriculture 18. 1938. P. 401-446.

Mean Winter Temperature	23.5°F
Mean Spring Temperature	43°F
Mean Summer Temperature	67°F
Mean Fall Temperature	49.5°F
Extreme Low Temperature	-31°F
Extreme High Temperature	105.5°F
Daily Range of Temperature	18°F
Average Date of the Last Spring Frost	May 10
Average Date of the First Fall Frost	Oct. 13
Average Length of the Frost Free Period	158 days
Beginning of the Growing Season	Apr. 13
End of the Growing Season	Nov. 4
Average Length of the Growing Season	204 days
Average Annual Precipitation	33.4"
Average Annual Snowfall	58"
Average Rainfall in Summer (June, July and August)	8.7"
Average Rainfall (April 1 - Sept. 30)	16.9"
Number of Days with Drought	28 days
Percent Possible Sunshine in Growing Season	54%

4. Drainage

The Twenty Mile Creek rises outside the township to the west on the flanks of the Ancaster moraine[7]. It meanders through the southern portion of the township, draining approximately fifty percent of it and when once more outside the township, it eventually flows over the escarpment at Ball's Fall and finally reaches Lake Ontario.

This drainage system has moderately dissected the clay plain in which it flows. Illus. 4 shows a section of the dissected clay plain just east of Smithville.

The Twenty Mile Creek in its early stages may have had a different course than it has now. Its flow is parallel with the east-west direction of the modest morainal ridges which help direct it eastward, but it is possible that the creek may have shifted back and forth across the clay plain in a meandering course before it tumbled over the escarpment.

As the creek cut down to bedrock near the Lockport-Guelph contact,

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[7]Chapman L.J. and Putnam D.F. The Physiography of Southern Ontario. University of Toronto Press, Toronto, 1951. P. 72.

Illus. 3. The Niagara Falls moraine, as evidenced in the background, is no topographic barrier. Its fifteen foot swell can scarcely be recognized. A field of oats has just been harvested on the southern slope of the end moraine.

Illus. 4. The dissected clay plain just east of Smithville is only moderately dissected, but this provision for drainage has made the agricultural land much easier to cultivate.

it became restricted in its southern boundary by the pre-glacial scarp of the Guelph dolomite. This is a possible explanation for the similarity, of course, between the Guelph contact and the Twenty Mile Creek.

The stream flows essentially on bedrock throughout the township, but in many places silting up has occurred, especially in the eastern sections of the creek where more of the soil has been carried into the drainage system. The fluvial erosion of the Lockport dolomite by the Twenty Mile Creek has been very slow. This bedrock is very insoluble and in some places irregular sections of this bedrock stretching across the stream course rise above the general stream level giving one the impression that the creek's flow has been halted. There is, of course, no actual stoppage of flow because the drainage system is able to follow the bedding planes when there is a sufficient volume of water as in the spring.

In the dry summer though, these sections of dolomite fording the creek are sufficient to help impede some of the flow of the low volume of water from the Twenty Mile Creek. As a result, this drainage system becomes a series of stagnant pools as shown in Illus. 5. On the other hand, none of the tributaries of this stream have cut down to bedrock as yet.

The deepest cutting into the bedrock by the Twenty Mile Creek is found just west of Smithville. The creek has cut back from the escarpment to this point to form a typical nickpoint. Four or five feet of bedrock are exposed by the time the rivulet reaches Smithville.

5. Soils

All the zonal soils present in South Grimsby township belong to the Grey-Brown Podzol great soil group. As previously mentioned, lacustrine clay materials are overwhelmingly the most dominant glacial feature in terms of areal extent. Thus one should not be surprised to find the most soil types

SOUTH GRIMSBY
TOWNSHIP
SCALE 1" = 1 MILE

SOIL MAP

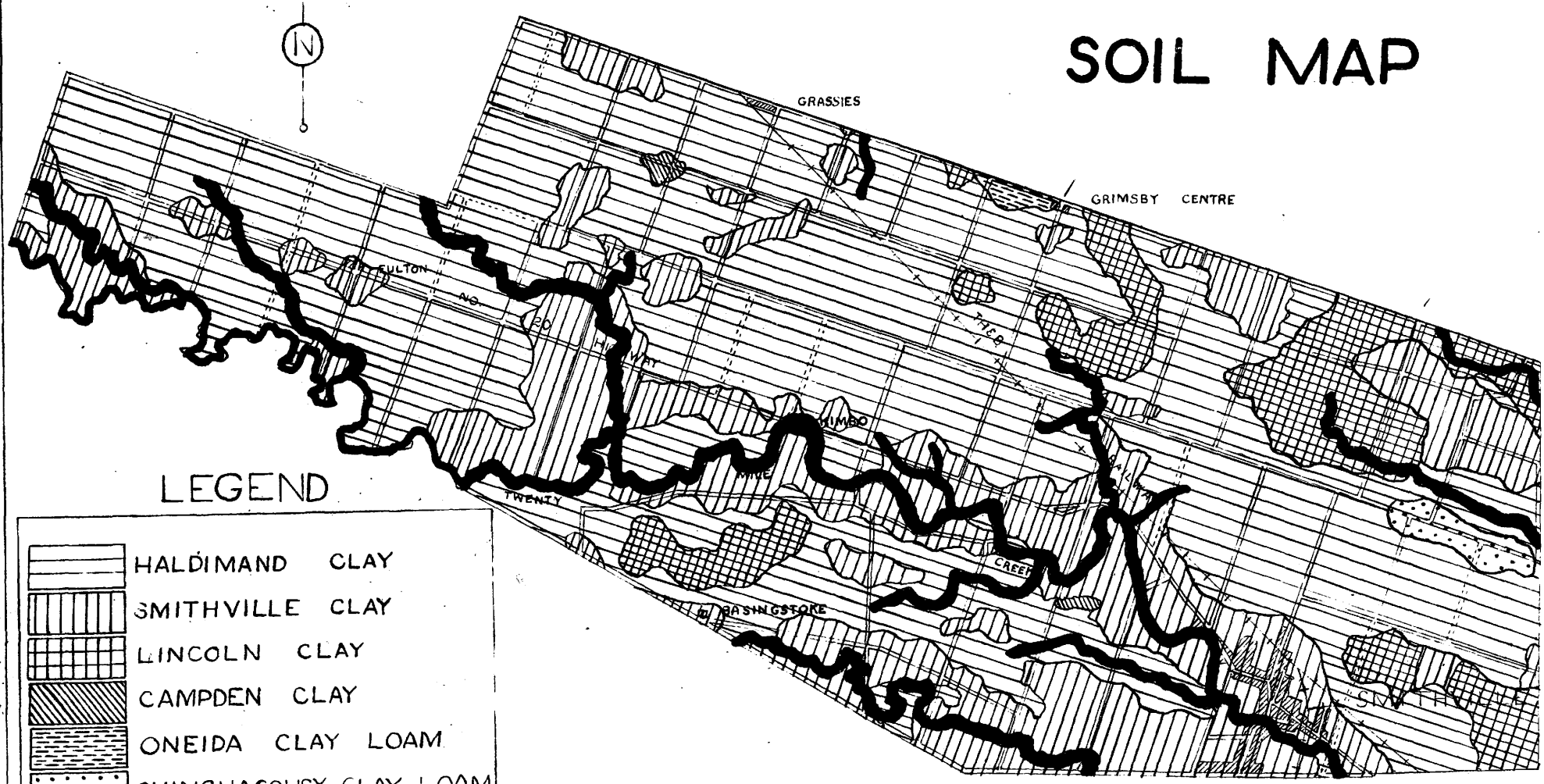
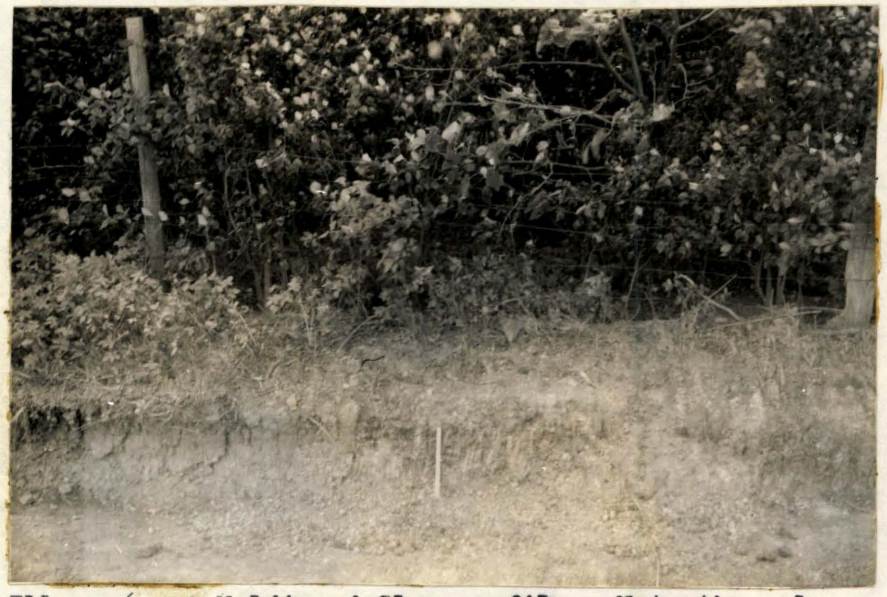


FIG. 4

Illus. 5. The Twenty Mile Creek becomes a series of stagnant pools in the summer, as shown above. Sections of dolomite fording the creek are sufficient to help impede some of the flow of the low volume of water.



Illus. 6. A Haldimand Clay profile. Note the pale brown mottled clay loam of the A_2 horizon about 8" from the surface. Also the adjacent dark brown mottled clay loam of the B_1 horizon underneath, which has received the leached materials.

in the township have a lacustrine clay origin. Only the Oneida and Chinguacousy series of soils and the bottomland soils do not have a lacustrine clay background. Fig. 4 shows the soil distribution within the township. In order that the soil variations may be thoroughly understood, a systematic soil description is given, and a breakdown of the grey-brown soil group into the following catenas with their accompanying series and types will help show local similarities and differences.

A. Soils Developed from Lacustrine Clay Material

These heavy soils are characteristic of large sections south of the escarpment. Few boulders are scattered over the surface and very few stones occur within the profile. These soils are generally very low in organic matter and display a characteristic light grey colour when cultivated and dry. They are extremely acid in reaction on the surface though carbonates occur about 20" below the A_0 horizon. The surface texture ranges from a clay loam through a silty clay and a clay to heavy clay. These soils bake very hard when dry and have a very poor physical structure. Areas of imperfect drainage occur within the well-drained areas and vice-versa, and though some areas of moderately poor drainage occur, very little poor drainage is mapped. The members of this catena are the Smithville, Haldimand, Lincoln and Campden Series*, being the moderately well-drained, imperfectly drained, the moderately poorly drained and the poorly drained members respectively. A few sinkholes in the south of the township, developed in the Guelph dolomite, have assisted in the drainage but their effect must not be overemphasized.

(i) Smithville Series - Smithville Clay

The Smithville Clay, which is the only member of this series present,

*Until the field work in the summer of 1958 by the Soil Survey of the Ontario Agricultural College, the Haldimand Series was called the Caistor Series and the Smithville Series was called the Haldimand Series.

occurs, for the most part, in the vicinity of the stream courses and where the topography is somewhat more sloping than usual. It is generally restricted to the drainage area of the Twenty Mile Creek in South Grimsby township. The external drainage is medium while the internal drainage is slow. The profile is not as well developed as that which would occur in coarser textured materials on comparable topography. Organic matter content is extremely low. Very few boulders are found on the surface, and practically no stones or grit occur within the profile.

Erosion problems occur within a very small fraction of the total area but they are locally serious. Gullies erode easily in the heavy clay. Small gullies are found where comparatively small streams or ditches flow into the Twenty Mile Creek. Sheet erosion is also a problem in areas adjacent to stream courses.

A cultivated profile has the following characteristics:

A_c - 0-4 inches light brownish grey, clay loam and silty clay loam; medium granular structure; friable consistency; very few stones; pH 5.0.

A_{2_1} - 4-6 inches light brownish grey clay loam and silty clay loam; fine nuciform to weak, platy structure; very friable consistency; pH 4.8.

A_{2_2} - 6-12 inches pale brown clay loam and silty clay loam; slightly mottled; large blocky structure; firm consistency; pH 4.8.

B_2 - 12-20 inches dark grey brown clay; slightly mottled; prismatic and large blocky structure; sometimes massive; hard consistency; pH 6.5.

B3 - 20-23 inches dark grey clay; large blocky or massive structure; calcareous; pH 7.4.

C - grey brown clay, containing lime concretions leached from the surface; highly calcareous; stonefree generally; pH 7.4+.

(ii) Haldimand Series - Haldimand Clay

This imperfectly drained soil occupies a greater area in the township than the other members of the catena. The topography on which the Haldimand clay is found is nearly level to gently sloping. Both its external and

internal drainage are slow. The profile is less well developed than that of the Smithville Clay, and mottling occurs in the A_2 horizon.

Erosion is almost non-existent because of the nature of the topography.

A cultivated profile, as shown in Illus. 6, has the following characteristics:

A_c - 0-5 inches grey-brown clay loam and silt clay loam; finely granular structure (when moist but bakes in clods when dry); friable consistency; pH 4.8.

A_2 - 5-8 inches pale brown mottled clay loam; medium nuciform texture and blocky structure; firm and hard consistency; pH 4.8.

B_1 - 8-14 inches brown mottled clay loam; medium blocky structure; hard consistency; pH 6.5.

B_2 - 14-20 inches dark grey clay; large blocky structure; plastic when wet; pH 6.8.

C - grey clay; calcareous; pH 7.4^+.

(iii) Lincoln Series - Lincoln Clay

The Lincoln Series is the poorly drained member of the Smithville catena. These soils occupy level to depressional areas in the township, the largest sections being located on the north and south of the end moraine.

The poor drainage conditions are reflected in the dark surface horizon and the drab grey mottled sub-soil.

A virgin profile has the following characteristics:

A_o - thin layer of partly decomposed leaf litter.

A_1 - 0-4 inches very dark grey-brown clay; medium granular structure; friable consistency; pH 6.8.

G1 - 4-11 inches very dark grey clay; mottled and massive; hard; pH 6.5.

G_2 - 11-22 inches dark grey clay and yellow brown clay; mottled; massive to large blocky; hard; pH 7.0.

C - grey clay; calcareous; stonefree; pH 7.4^+.

(iv) Campden Series - Campden Clay

The Campden Series is the poorly drained member of the Haldimand catena. This series like the Lincoln Series is found in depressions throughout the township. There are no large continuous areas of this soil type. Its external drainage is very poor, and due to the very high clay content, its internal drainage is slow. The soil bakes into hard clods when dry, and is extremely difficult to cultivate unless moisture conditions are ideal. The reaction is usually near neutral, being much more alkaline than the well-drained soils in the catena.

A virgin profile has the following characteristics:

A_o - 0-1/4 inches partly decomposed leaf litter.

A_1 - 1/4-4 inches very dark grey-brown clay to clay loam; medium granular structure; friable consistency; pH 6.8.

G_1 - 4-11 inches very dark grey mottled clay; massive structure; hard consistency; pH 6.5.

G_2 - 11-22 inches dark grey and yellowish brown mottled clay; massive to large blocky structure; hard consistency; pH 7.0.

C - grey clay; calcareous; stonefree; pH 7.4^+.

B. Soils Developed from Fine Textured Limestone and Shale Till

These fine textured limestone and shale till materials are characteristic of large areas north of the escarpment, but much of this parent material was incorporated into the Niagara Falls moraine upon the transgression of the Lake Ontario ice lobe. These soil materials have a grey to greyish-brown colour and contain considerable reddish brown shale fragments. This, in all probability, indicates that the parent materials of these soils had their origin from the Grimsby shale member, outcropping north of the escarpment. The parent materials are mainly calcareous,but the solum is generally very acid in reaction. The soils are usually low in organic matter content. The till is fairly stoney, but in some areas the upper part of the profile is

almost stonefree.

Soils in this area form a single catena and are divided into two series, the Oneida, which is well drained, and the imperfectly drained Chinguacousy.

(i) Oneida Series - Oneida Clay Loam

The Oneida Clay Loam type is found in a single small pocket on the end moraine at the northern border of the township. The profile is approximately 27 inches deep, and the horizons are clearly defined. The topography is smooth to moderately sloping, and the sheet erosion is severe. Internal drainage is moderate, and the external drainage is good, but the organic matter content is extremely low.

A virgin profile has the following characteristics:

A_o - thin layer of very dark brown leaf litter.

A_1 - 0-3 inches very dark brown clay loam; fine crumb structure; very friable consistency; few stones; pH 4.3.

A_2 - 3-6 inches brownish yellow silt loam; platy structure; very friable consistency; pH 4.5.

A_{22}- 6-9 inches light yellow-brown silt loam; platy structure; very friable consistency; pH 4.7.

B_1 - 9-15 inches light yellow brown clay; medium blocky structure; firm consistency; pH 5.0.

B_2 - 15-27 inches dark brown clay; mottled; medium blocky structure; firm consistency; pH 5.5.

C - grey brown clay till; calcareous; stoney; plastic consistency; pH 7.4.

(ii) Chinguacousy Series - Chinguacousy Clay Loam

This series is the imperfectly drained member of the Oneida catena and occurs on the lower slopes of the moraine. The profile is similar to that of the Oneida soils except that mottling occurs in the lower A and B horizons. Here, the topography is generally smooth and gently sloping. In the Chinguacousy soils, the internal drainage is slow and the external drainage

varies, but the organic matter content remains extremely low.

A virgin profile has the following characteristics:

A_c - 0-6 inches dark grey brown clay loam; fine crumb structure, friable consistency; few stones; pH 5.0.

A_2 - 6-10 inches pale brown clay loam; slightly mottled; weak platy structure; friable consistency; few stones; pH 4.8.

B_2 - 10-24 inches dark brown clay; mottled; coarse blocky structure; hard consistency; few stones; pH 6.5.

C - light brown-grey clay till; calareous; pH 8.0.

C. Soils Developed on Flood Lands Along Stream Courses

This soil lying along stream courses and subject to flooding is designated as Bottomland. It occurs in a narrow strip in the township except in the lower courses of the Twenty Mile Creek near Smithville. Here, there is a wider strip of flood land with eroded stream banks lining the sides of the creek. The drainage and texture are variable, and usually there are successive layers of alluvial silt, fine sand and clay intermixed with layers of organic matter occurring in the soil.

6. Natural Forest Vegetation

The type of natural vegetation found in any area is a function of climatic and soil factors producing certain types of environmental conditions in which plants can grow. Once established, vegetation in turn exerts considerable influence on the drainage and the friability of the soil. In classifying and mapping soils, those features which can be observed in the profile are used as the criteria for making type separations. It is impossible to determin to what extent such features have been influenced by vegetation, since it is only one of the several soil forming factors. In an area such as South Grimsby township, it is indeed difficult to reconstruct a picture of the original vegetation without referring to historical records because under present land use, only about six percent of the total land is wooded. A reconstruction of

the natural forest vegetation would help determine the areal extent of some of the trees used for lumbering.

Most of the remaining natural vegetation lies in the ill-drained areas of the Haldimand Clay and the Lincoln Clay. There was no pressure for clearing all of the wooded areas of the township completely because the acreage used for pasture in dairying was more than quite sufficient.

The original forest was dense with many deciduous trees and some conifers. It is recorded that among these exploitable hard and soft woods, wild grapes, plum and crabapple trees grew in abundance[8]. Swamp oak, elm and white pine were the most plentiful trees according to historical records. Swamp oak and elm, being better adapted to the poorer drained areas of lacustrine soils, occupied the level clay plain while the white pine, which fares better on lighter soils and better drainage, occupied those areas in the valley of the Twenty Mile Creek. It was said in the nineteenth century that here could be found oaks six feet in diameter and sixty to seventy feet in height and the white pine five feet in diameter and one hundred and seventy-five feet in height[9].

The white pine, the only abundant conifer, was cleared early to be used in the building of Great Lakes sailing vessels as well as pioneer homes.

Today, swamp oak and white pine are still present in the uncut woodlands but they are extremely small in numbers. Elms and maples are now the dominant species occurring on all soil types together with smaller numbers of shagbark hickory, beech and basswood.

7. Cultivated Crops And Their Edaphic Relationships

Certain of the cultivated crops have adjusted to the present climatic

[8]Lincoln County (1856-1956) Lincoln County Council, St. Catharines, Ontario, 1956. P. 137-138.

[9]Lincoln County (1856-1956) ibid. P. 137-138.

and soil conditions while others have not.

Hay is one crop which has adjusted because this forage crop can be grown over a wide range of temperature, moisture and soil conditions. The temperature and moisture requirements are quite low for most hays. The combination of high temperature and high humidity is very effective in damaging the crop since such a condition favours the development of stem and leaf diseases, and the rapid growth of many weedy plants which serve to smother out the hay. This is especially true of alfalfa. Fortunately during the period of high summer temperatures, there is a water deficiency and thus no climatic hazard. Hays must have proper soil conditions with respect to drainage features, soil reaction and availability of phosphates[10]. In South Grimsby township these proper conditions are lacking. On the whole, there is poor drainage, acid soil reaction and a low phosphate content. Poor drainage limits root development and provides conditions favouring the heaving of plants during the winter and early spring months. Alfalfa is especially sensitive to soil acidity and rarely grows to advantage at pH levels below 6. The two major soil bodies of South Grimsby township have approximately an average pH of 4.6. All hays have quite an aversion to phosphorus deficiencies,which help to create the yellow colour in the leaves. The clay soils, on the other hand, have provided even without fertilization a high content of potash, which is an important mineral in alfalfa's growth.

Grains are not as tolerant to a variety of physical conditions as are hays. Oats are the best adjusted of the grains because this crop thrives under cool moist conditions. There is quite a heavy precipitation in the rather cool spring of the township,and this fact added to the fact that a warm dry summer

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[10]Klages K.H.W. Ecological Crop Georgraphy. The Macmillan Company, New York, 1942. P. 535.

follows helps to mature the crop early. High yields of oats are obtained on heavy clay soils,which are very retentive of the moisture so much needed by the crop in its early stages of growth.

Wheat is more specific in its physical requirements than oats. Only the combination of high temperature and high humidity is fatal to the growth of wheat and, as already stated with relation to oats, these two climatic conditions do not occur at the same time. Unfortunately though, wheat has not adjusted itself to the present soil conditions. The clay soils have the property of moisture retentiveness needed for the successful growth of wheat, but this crop must have fairly good drainage without exception. This, of course, is not present and the crop suffers. The high concentration of carbonates and the lack of phosphates in the soil are also added hindrances to the successful cultivation of wheat.

The general climatic requirements for barley are quite similar to wheat, and it too is not well adjusted to the soil.

Rye can be grown under a variety of climatic and soil conditions like oats.

Corn, of all the grains grown in the township, is the most ill-suited for cultivation. While 204 days satisfies the length needed for the growing season and the night temperatures rarely drop below the critical level of 55° during the summer, the moisture and soil conditions limit the production of corn. There is a high rainfall during the spring,but this crop is very conservative in the use of water during its early phases of development. Corn must obtain water from the soil during the summer months when its rapid growth is at a peak,but this is the period of greatest evapotranspiration. The water table is lowered as a result,and the crop suffers. The crop must have certain specific soil conditions. Fair drainage is essential because the poorly drained

soils are too cold in spring to give the young corn seeds their initial sprouting. The heavy clay soils have pH values less than 5.5, which is too acid for the proper growth of corn. These clay soils have a high potash content, but the lack of nitrates and phosphorus in the soils have proved detrimental to corn, especially in affecting adversely the size of the stalk. Also nitrogen deficiencies produce the yellowish colour of the crop's leaves, which will eventually lead to the lowering of the corn's food value. The lack of phosphorus in the soil is further reflected in a slow initial growth of the crop.

Grapes are best adapted to warm, fairly well-drained soils and a climate that is free from early fall and late spring frosts. The farther the grapes are away from the moderating influence of the lakes, the greater the risk of frost. However, the fairly high amount of moisture during the spring creates the greatest risk in raising vineyards. The resulting precipitation cannot be drained away rapidly enough from the heavy clay soils, and fungus attacks, such as downy mildew and black rot, are quite common if the grapes are not sprayed early.

Orchards are better adapted to the areas which have moderate climatic conditions and well drained soils. The climatic conditions are suitable for hardy fruits such as apples, pears and plums because blossoming does not commence until well after the last risk of frost, and there happens to be sufficient rainfall for early growth in the spring. Drainage is again a problem because fruit trees are better adapted to fairly well-drained sites although the soil does not have to be sandy. Diseases which have been caused by poor drainage usually strike these hardy tree fruits as they do the grapes, and if early spring spraying does not take place, apple rust, apple scab and pear blight etc are likely to occur.

Vegetables and various berries are best suited to those soils which are not too heavily textured because they need fairly good drainage. A certain amount of moisture must be retained in the soil though so that the loam seems to be the ideal soil. It combines the qualities of good drainage and moisture retentiveness. Some root crops, such as potatoes, have been known to suffer when there is a moisture deficiency in these soils in the period of greatest water need.

It is very important to discuss the relationships between the various crops cultivated in the township and the climatic and soil conditions because these edaphic factors have exerted controls over the past and present methods of farming.

8. Land Types

A land type is a small physiographic unit with a certain homogeneity of slope, drainage conditions and soil textures as well as depth to bedrock. It may include several soil types, and these will be similar in all of the above respects. South Grimsby township has four land types, as shown in Fig. 5.

Land Type I is the dissected clay plain and the better drained sections of the moraine. There is no heavy dissection within this type, but there is sufficient slope to provide moderately good runoff. Soils are moderately heavy, and internal drainage is slow. The better drained sections of the moraine are very similar in parts to the dissected clay plain type. This glacial feature has very low relief and a fairly heavy clay overlay. Thus, there is scarcely enough criteria for separation.

Land Type II, the level clay plain, includes all the area overlain by the extremely heavy soils of the Haldimand type and the poor drained sections of the moraine. There is little runoff, and upvale ponds, as mentioned before, exist in some sections of the land type. The central part of the moraine is

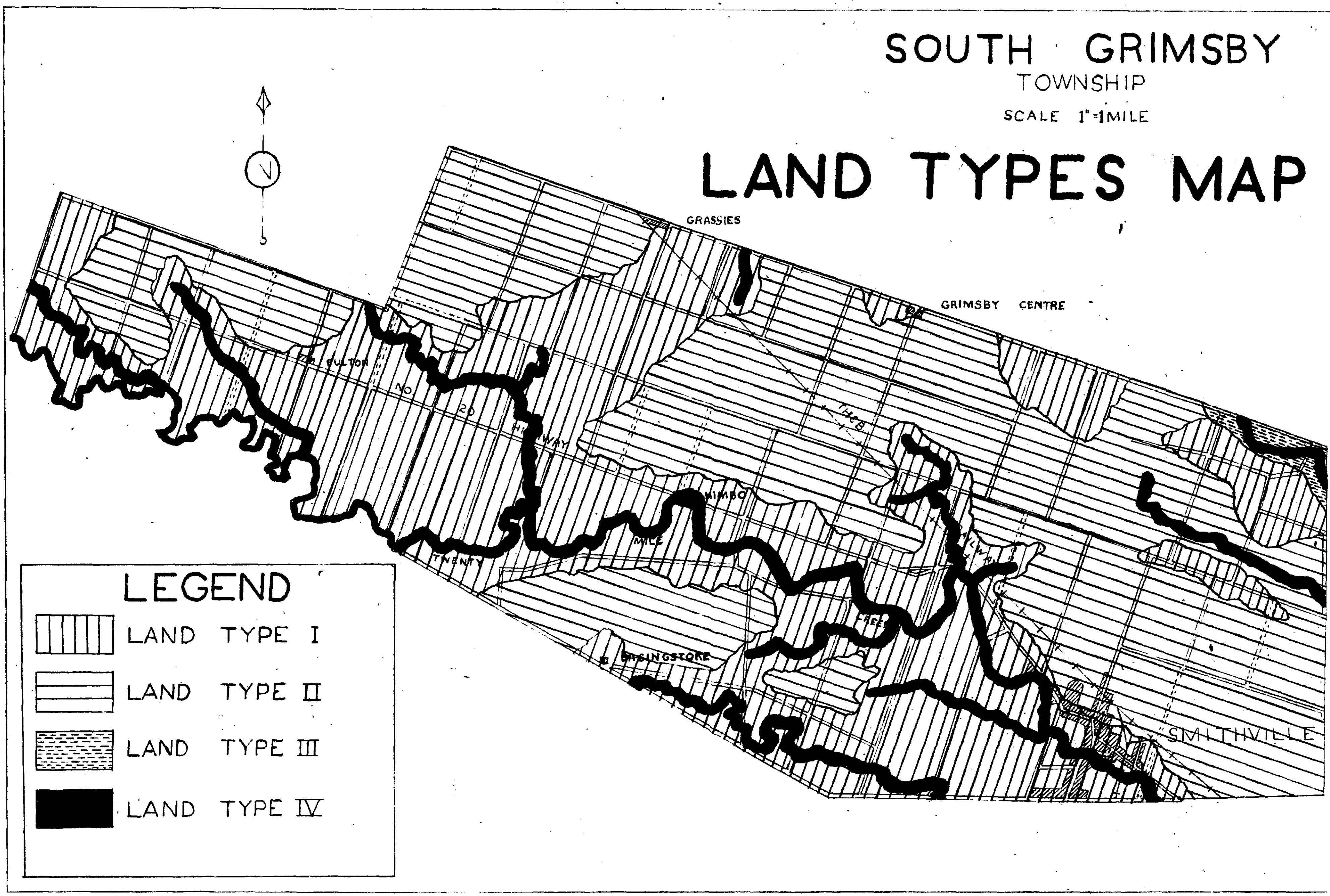
SOUTH GRIMSBY
TOWNSHIP
SCALE 1" =1 MILE
LAND TYPES MAP
GRASSIES
GRIMSBY CENTRE
FULTON
SMITHVILLE
LEGEND
LAND TYPE I
LAND TYPE II
LAND TYPE III
LAND TYPE IV

FIG. 5

somewhat depressional and closely resembles the level clay plain land type. The drainage of Land Type II must depend on slow internal percolation on these level to depressional surfaces.

Land Type III is located within the spillway. There is a shallow depth to bedrock and only a thin overlay of clay soils. This type of land is depressional with the accompanying features of poor drainage and heavy textured soils as in Land Type II.

Land Type IV includes all that land which undergoes periodic flooding. Only the sections of the spillway which are adjacent to the stream flowing through it are subject to flooding. This bottomland as it is called varies in slope, drainage, soil texture and depth to bedrock. Some of the deepest overburden is west of Smithville,where there are broad stretches of silt.

Small pockets of Campden Clay, as well as sandy loam patches, are present within the township,but their small areal extent makes it unfeasible to include them as separate land types. These sandy patches have been incorporated into Land Type I and Land Type II.

Conclusion

South Grimsby township is favoured with the fact that it is an area of gentle slope, and no topographic barriers to movement exist within the township. There are no extensive areas of stoney ground or exposed bedrock to hinder cultivation. No severe climatic conditions hinder man's farming of the land. On the other hand, most of the soils are very heavy. These soils, originating from the meltwater deposition of the recent Wisconsin glaciation, have certain series, such as the Smithville Clay, which are better drained thar others,but still about seventy-five percent of the township drainage is imperfect or poor.

CHAPTER II - HISTORICAL GEOGRAPHY

South Grimsby township is situated off the main corridors of early traffic in the Niagara peninsula, which lie adjacent to the Lake Ontario and Lake Erie shorelines. Nor is there any significant focal point within the township. The movement of various peoples into this area has thus been sporadic and rather uneventful.

1. Period of Indian Settlement

The Neutral Indians, a sub-family of the Iroquois, are the earliest known inhabitants of the Niagara peninsula and South Grimsby township. According to French exploration accounts, this tribe acted as a buffer between the Five Nations, whose territory lay to the east of the Niagara River and their detested rivals, the Hurons, who occupied the area to the northwest along the shores of Lake Huron and Georgian Bay[1]. Considerable acreages of maize have been shown to exist in the districts around the township according to archeological evidence. This thus shows there was no aversion by the Neuters to settling the interior although the land areas adjacent to the shorelines of Lake Ontario and Lake Erie remained the prime focal points of settlement. Arrowheads and hunting knives, which were used to resist the hostile tribes on either side as well as furnish weapons for domestic survival, were derived from the flint deposits at Port Abino on the shore of Lake Erie[2]. As a result, many of the Neuters passed

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[1]Middleton J.E. and Landon F. The Province of Ontario - A History 1615-1927. The Dominion Publishing Co. Ltd., Toronto, 1927. Vol. I P. 7.
[2]Middleton J.E. and Landon F. ibid. Vol I P.7.

through the township, carrying the flint deposits northward to the settlements on the shores of Lake Ontario. Quite frequently, some of the tribe members hunted on their way through South Grimsby township.

The Neuters, as well as the Pétans, a small Huron sub-group who lay to the west of the Neuters, were exterminated by the Iroquois in the early seventeenth century. The Iroquois were still interested in the better hunting grounds south of the Great Lakes and did not move into the territory formerly occupied by these Neuter Indians. The Mississaugas, an Algonquin tribe, had claimed the Niagara peninsula before the Neuters came but had never moved into it. Now they proceeded to do so, justifying their right of occupation on this former claim.

After the American Revolution, all of the Iroquois except the Oneidas and a few of the Tuscaroras were forced to go to British North America in order to stay within the territory of their allies, the English[3]. The Iroquois concluded a successful treaty with the Mississauga Indians and purchased their territory which included the lower sections of the Grand River as well as the Niagara peninsula. As the land along the Grand River offered a better agricultural potential, it was the favoured area for Iroquois cultivation while the less fertile area to the east, including that now occupied by South Grimsby township, was left in forest and used as a hunting ground. Some of the Iroquoi tribesmen reported that there were rich deposits of lead near the

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[3]Middleton J.E. and Landon F. ob. cit. P. 7.

Twenty Mile Creek or Kenochdaw, which is the Indian name for lead river, but very few people regarded the Iroquois reports as important[4].

2. Initial European Contact

French Canadian hunters and fur trappers were known to have passed through the township because it is recorded that they replenished their magazines with lead from the deposits found by the Iroquois along the Twenty Mile Creek during the latter part of the eighteenth century[5].

3. Early European Settlement (1787-1881)

The Niagara frontier of New York State was inhabited in the American revolutionary period by many British sympathizers. When the results of the revolution made clear to these Loyalists that they were unwelcome in New York, many crossed over into the Niagara peninsula, then part of Western Quebec. In 1791, the peninsula was incorporated into the new province of Upper Canada.

The Richard Griffin family, who had journeyed from Nine Partners, New York, were the first white settlers. In 1787, they chose as their home in the township, a heavily forested area at Concession 9, Lots 17 to 20 near the Twenty Mile Creek. One advantage of this site was that the Twenty Mile Creek, which had started to cut into the bedrock about one-third of a mile upstream, provided at this point a suitable site for a water oper-

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[4] Lincoln County 1856-1956. Lincoln County Council, St. Catharines, 1956. P. 137-138.

[5] Lincoln County 1856-1956, ibid. P. 137-138.

ated grist mill. A second factor was that small veins of lead ore, lying in pockets of the Guelph formation,were thought to be an important economic find.

Other United Empire Loyalists entered the township during the late eighteenth century and provided a core of population to which other settlers were soon to be added. During the first half of the nineteenth century, there was a great influx of immigrants from the British Isles who swelled Smithville village and filled in some of the unoccupied spaces in the township. The Scots were soon as numerous as the English immigrants,but the Irish who came in two great waves following the potato famines of 1816 and 1846, outnumbered both the former groups in 1851.

The Great Western Railway, running along the Lake Ontario plain,opened in 1853, and this new transportation route was actually a stimulant for immigration. It was the first railroad in the peninsula,and the population tended to crowd near it in order to enjoy its services.

Immigration continued to decrease slowly from the year 1851 to 1881. Nearly all the agricultural land was occupied by 1871, and very little land was left for the immigrants. The people of English descent constituted more than 50% of the township's population by 1881. The only non-British settlers before the late 1860's were a few French from Lower Canada, but, however, after this period settlers from other countries began to make their appearance. Germans were the first emigrating from their Mother country, partly because of overcrowding and partly because of the fear of the rise of the Prussian state. Many Dutch, who had an

even more keen competition for land within their country, also left for a new life in Ontario, and a slow but steady stream of German and Dutch drifted into the township. Other non-British ethnic groups only formed a relatively minor portion of the population until 1881 as compared with the relative strength in numbers of the German and Dutch.

The people who farmed in the township during this period engaged primarily in mixed farming. The United Empire Loyalists had cleared the land with the aid of the oxen and broke the heavy clay soils with the crudest hand-wrought plows. Only small quantities of wheat, oats and forage crops were produced at first, but gradually, as more land was cleared, the necessity for improved and more efficient machinery increased. The horse superseded the ox, the plow was improved, and the disc harrow and the disk drill were introduced to make cultivation much easier. Around 1868, the mowing machine came into use and a little later the reaper.

The early farmers concentrated on raising grains for local sale or export trade and selling livestock and their milk products. The yields of the grains were low because the farmer did not realize that the soil needed heavy application of lime to counteract acidity. The sale of grains to Great Britain decreased after 1846 when the Corn Laws were repealed. Free trade was developed, and Canada was no longer in the favoured position of being one of the few countries who was supplying Great Britain with grain. The Reciprocity Treaty of 1854 with the United States helped to compensate the farmers by providing some markets for wheat export,

but a short time later the Prairies became a much more important source of grain for both the United States and Canada, and the wheat growing areas of Ontario subsided in importance. Local trade of grain in the township still helped the farmer compensate for some of the losses suffered in the exporting field.

Most of the milk products were made into butter and cheese, which could be easily transferred by wagon to the large surrounding urban centres. The sale of milk was very unimportant at this time because of the lack of good transportation facilities to carry the fluid milk to the urban centres. Besides, there was little demand for milk at a distance this far out by the dairy firms of these growing cities.

Fruit growing entered the township during the mid 1860's, but there were few serious attempts to engage in the occupation full time as most farmers had done below the escarpment. This was because of the unsuitability of the heavy soils for most fruits. Besides, there was a large sand plain north of the escarpment well suited for fruit growing. Fruit growers in South Grimsby township could never hope to compete with this former area.

Smith Griffin, the recognized founder of the village of Smithville, was the first person to engage in an urban activity. He ground the grain of the surrounding settlers first with his oxen driven tread mill and later in 1816 with his newly constructed grist mill as settlement increased. Smith Griffin's brothers helped him to erect a general store at this time to serve the domestic needs of the grist mill bound farmers. Lumbering prospered in the early days of forest clearing, and an

ashery for manufacturing potash gave the Griffin family added income.

The township under discussion was at this time linked with North Grimsby to form the township of Grimsby, and many of the settlers, especially those in the western part of Grimsby township, looked to the town of Grimsby as their main supply centre. Smithville was very undeveloped at this time. There was a definite north-south orientation of trade during these early days because of the heavy dependence on shipping within Lake Ontario. Goods were landed in Hamilton and shipped by wagon to Smithville from Greensville. This reliance on a north-south trade route disappeared gradually even before the division of Grimsby township in 1883.

Smithville's original location factors soon diminished in importance. Very little lead and silver ore was extracted after the mid nineteenth century, and the influence of the water power site waned when coal was used to steam power the grist mill.

Even though the agricultural yields were poor in South Grimsby township, the demands were high enough to warrant continued grain production. As a result, Smithville became the regional centre for services and supplies because the large grist mill was more able than any other grist mill in the surrounding region to grind larger bulks of grain in a shorter time. The urban centre became the regional centre for the bordering townships of Caistor and Gainsborough, which had no important centres of their own. Gradually a considerable commercial section, which contained most food stores and clothing shops, grew up on Griffin

Street near the grist mill. Many small industries had sprung up. Some such as harness works, tanneries and blacksmith shops catered largely to the agricultural needs of the settlers while others including woollen mills, shingle factories, carriage establishments and cabinet works effectively supplied all the township's settlers. By 1852, 450 people occupied the village[6]. Institutions had made their appearance early in Smithville, and a large public school and two Methodist churches were founded to fulfill the educational and spiritual needs of the many Methodist people in the area.

The agricultural hinterland of Smithville declined in importance because more people were attracted to the better grain growing districts which lay to the northwest on the new frontiers of Southern Ontario as well as in the Prairies. Also a world wide depression after the 1870's helped to decrease the demand for agricultural products. No one wanted to put out large quantities of energy trying to convert the physically handicapped soil into a profitable means of support. The village still managed to stave off deterioration.

Smithville was a "hive of industry" still during the 1870's. New industries had been set up to cater mainly to the 700 people who lived in the village and those farming folks who still persisted to farm the surrounding region. A fulling and carding mill supplemented the woollen mill, and numerous small industries such as foundries, chair and coffin factories, wagon works, etc. were

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[6] Smith W.H. Canada, Past, Present and Future. Thomas Maclean Publishing Co., Toronto, 1852. P. 209.

established. Commercially, there was an expansion in the number of food stores, clothing shops and various other services. Three small hotels had been erected in response to the increasing importance of the village as an overnight stop for travellers journeying through the peninsula. Institution expansion kept pace with the urban growth. Two public halls had been built during the period; thus, showing the growing interest in the government of the community as well as the need for organized meetings for the village fathers. A high school had been erected. Three additional new churches were built for the non-Methodists. On the whole, the village had nearly all the important commercial, industrial and institutional facilities to serve the people on the farm and in the urban centre.

4. Later Settlement (1881-1945)

In 1883 Grimsby township was divided and South Grimsby township was left to govern its own affairs. The township council had been rather unattracted to the idea of shifting meetings between the centres of Grimsby and Smithville, and now that North Grimsby township had come into a new era of fruit farming, it was decided that the southern section of the township, which had few agricultural advantages, was now just a hindrance. Its upkeep scarcely balanced the taxes collected, and besides North Grimsby could operate more efficiently with its more compact size. Thus a severance seemed advantageous.

For more than one-half a century, South Grimsby township remained stagnant with respect to population growth. There was only an addition of 127 people from 1901 to 1941, and this was

due to natural increases. There was a loss of 231 people during the period from 1891 to 1901. The rural population still managed to outnumber the urban during this period.

The dry years of the depression of 1931-35 proved to be disastrous in the Prairie provinces, and many of the Slavic settlers in this region were forced to leave their farms because of crop failures. Some were brought by the government in the mid 1930's to settle the poorer lands within the township. Czech, Ukrainian and Poles form the largest majority of the Slavic settlers.

With the decline of grain production, South Grimsby entered into a period in which dairy farming predominated over all other farming pursuits. Those who did not depart either for the city or the western frontiers, decided that dairying could be made profitable because there was less need for grain production as forage crops formed the major part of the cattle feed. Much of the land left by the departing farmers was bought by those who remained and was either used for pasture or returned to woodland if it could not be used. A steady increase in the acreage used for hay took place because of the new emphasis on dairying, and large areas of pasture were commonly used in rotation between forage crops and grazing.

The new industry of dairying had trouble with diseases in the early years of its expansion. Water stagnation in mid-summer was responsible for giving breed to various types of cattle diseases.

There were no heavy demands for the milk of the township until automobile transportation had developed sufficiently to help bring

the retail trade influence of the large urban centres, as Hamilton and St. Catharines, into the township.

During World War I, there was a rapid decrease in the number of smaller farms, especially those under 50 acres in size, and South Grimsby township lost more than twenty percent of its rural families. The war had made heavy demands for unskilled labour in manufacturing industries, and many of these people were attracted to the fairly high and steady wages offered in the cities. However, during the 1920's, there came an increase in the use of automobile transportation, and this fact coupled with the arrival of a new period of urban growth stimulated the demands for larger volumes of milk. The Holstein cow, which has one of the highest milk capacities for dairy cattle, became a more increasingly used breed because of the new emphasis on quantity rather than quality. Practically all the hay and grain produced in the township was fed to the dairy cattle. This scheme did not prove to be as expensive as was first thought because considerable quantities of organic materials in the form of barnyard manure were put back in the acid soils.

Sheep raising has always been of secondary interest to dairying because of the animal's higher susceptibility to disease than cattle. Besides, there was never any heavy demand for wool and mutton in the Ontario market. With the establishment of large farm units during this period of later settlement, there seemed to be more land left for pasture and a slight increase of sheep, mostly of the Shropshire variety, took place. But, by the end of 1945 this activity died out to a former shadow of its self as milk

sales became more profitable, and more dairy cattle were being raised.

The heavy poorly drained soils have never been particularly well suited to corn cultivation, and as a result, there has been no particular stimulus attached to hog raising. There was an increase in the number of hogs during the World Wars because of the expanded market for meat, but this farming industry sank back to its former low status both times.

The village of Smithville remained stagnant and may have even slightly declined after the 1880's. The urban centre was never incorporated as a village because it underwent decline at this time. Between 1887 and 1889, it was administered as a police village but then reverted to become simply a part of the township until 1914 when it was re-incorporated as a police village. The T.H.& B. Railway was built from Hamilton to Buffalo through Smithville during the early 1930's, but the period of railway stimulation was over. Agriculture was struggling then as it is now, and its condition was reflected in the relative unimportance of the village of Smithville.

5. Post War Development

After the second World War, there was a strong movement among urban workers to live in the suburbs and within small urban centres. Between 1941 and 1956, a period of only fifteen years, the township population increased by the rate of 25%. For the first time, the rural population was outnumbered by the combined urban and suburban folks. Smithville during this period woke from a long period of standstill and began slowly to grow.

Many foreign immigrants were brought into the township to

settle on the farms during this period. There was a heavy settlement in Ontario of the Dutch who had been made homeless by the flood of the Zuider Zee in February, 1953. Some of the poorer and cheaper lands in South Grimsby were allotted to some of these Dutch immigrants by the government. The Dutch were not discouraged by the heaviness of the soils and poor internal drainage because they were well acquainted with these soil types in their native land. A Jewish colony from Montreal made its appearance in 1953. They have settled on the sites of abandoned farmsteads south of the Twenty Mile Creek.

Poultry raising, beef cattle raising and fruit cultivation, especially of grapes, became important farming pursuits after the second World War. There was less emphasis in dairying, and a new era of agricultural development began in South Grimsby.

Smithville no longer primarily became a centre for commercial families serving the township as well as a town for retired farmers. New people were injected into the community, and two new surveys were added: the Dufferin Survey and the Wade Survey. The former was completed not long after the second World War while the latter has only recently developed. The reawakening has been slow though and the community still only numbers 848 inhabitants.

Conclusion

The area within South Grimsby township has always lacked a dense population because of its poor physical background. Even the Indians in prehistoric times avoided the heavy soils of this part of the Niagara peninsula. The light sandy soils below the escarpment and towards Lake Erie were much more easily cleared and worked. It did not take later settlers long to discover that these

soils were too poorly drained and too acid to grow sufficiently good grain crops. As a result, many settlers took their possessions and went either to the larger urban centres or pushed forward into the new frontiers of Ontario or other provinces. People like Smith Griffin, who was one of the township's first real pioneers, helped to stimulate growth by providing services and without this it is quite possible that rural growth would have ceased long before it did. After the second World War, South Grimsby township came under the influence of the movement to the suburbs, and this fact has helped to initiate a new period of population growth. Thus Smithville became less and less dependent on its agricultural hinterland when it was able to provide better services for these suburban dwellers.

CHAPTER III - AGRICULTURE

Agricultural development is a striking feature in South Grimsby township, and it is one of the longest established and most fundamental activities. The township actually lies on the boundary between the two agricultural regions of Southern Ontario and contains primarily second class farming[1]. The soils are too heavy and too poorly drained internally to be used for very intensive farming. The northern two concessions come under the influence of the Niagara Fruit Belt as fruit farming has pushed south from the sand plain below the escarpment. The larger southern portion of the township is engaged in dairying and is part of the Western Dairy Belt, which extends from Oshawa to London.

1. Present Agricultrual Land Use.

The distribution of crops within the township is closely related to the heaviness and poor drainage of the clay soils. Soil texture was recognized early by the farmers as a factor influencing land utilization and crop management. The present agricultural land use is shown in Fig. 6.

Land Types I and II cover nearly all of the township, and there is not enough variation in their physical features to warrant the special discussion of the relation between each crop and its land type. The heavy, acidic and poorly drained clay soils have a decided influence on nearly all of the agricultural land use of the whole township. The drainage of the dissected clay plain land type is better externally than the level clay plain land type, but the

[1] Putnam D.F. Canadian Regions. J.M. Dent and Sons (Canada) Ltd. Toronto, 1954. P. 241.

same internal problems are involved in crop raising. Only the bottomland remains relatively free from the clay soils, but then again its importance for crop raising is restricted because of its small areal extent.

Hay is the chief crop grown in the township because of the high requirement for forage in the dairying industry. Forage crops are grown on about thirty percent of the farmland during an average season. Alfalfa is the dominant type of forage crop grown, but quite significant amounts of clover and timothy are cultivated. The dissected clay plain land type is moderately well drained externally but not actually well enough to meet the requirements for a high yield of forage crops. Nevertheless, alfalfa is better suited to this land type than any other in the township, and with reference to Fig. 6, it is evident that the Smithville Clay is being used for hay cultivation more than any other soil type. Deep plowing has been done, and artificial drainage channels have been constructed on the Haldimand Clay to help alleviate the poor conditions for these crops as well as others. Illus. 7 depicts a field with an artificial drainage channel. In order to counteract the acidic condition of the soil, very heavy applications of lime have to be made.

A particularly high production of hay is found around Smithville, as shown in Fig. 6. Most of those fields used for forage crops are devoted to the cultivation of alfalfa. This has developed because of the presence of the Green Melk industry in the village. The Green Melk Company located at Smithville because there was a good market for alfalfa meal in this section of the

Illus. 7. Artificial drainage channels, such as the one above, are quite prevalent in the level clay plan. If undrained areas are left stagnant, there is great danger of plant and animal diseases and a reduction of the arable land.

Illus. 8. The dissected clay plain is extremely subject to soil erosion, as shown above. Note the sheep in the background. The poor land practice of grazing sheep on the dissected clay plain only leads to greater soil erosion.

Western Dairy Belt. The alfalfa is dehydrated at the plant and then shipped to feed mills where it is mixed with other feeds to form the feed concentrate.

On the whole, conditions for growing grain crops in South Grimsby township are not very favourable, but still 15% of the land has been brought under this type of cultivation. Two-thirds of the grain area is in oats, which are produced almost exclusively to be used as a feed for livestock. Oats are fairly well distributed throughout the township because it is less specific in its soil requirements than either wheat, rye or barley. As a result, they are often grown in the least favoured place in rotation, as after a heavy feeder like corn.

Wheat is not fed to the dairy cattle in large amounts because it is too expensive to be used for a feeder. Since this grain is not an essential to the dairying industry, only about 5% of the area of the township is used to grow this crop. Wheat must have fairly good drainage, and deep plowing isdone to help alleviate the poor drainage conditions. Nearly all of the wheat grown is sold to the feed mills.

Very little barley and rye are grown in the township. In the 1956 census only four acres of each crop are recorded. Rye and barley suffer from unpopularity as foods. Improvement in the means of transportation and the expansion of world trade no doubt played an important part in this trend away from rye and barley to greater wheat consumption[2].

[2]Klages K.H.W. Ecological Crop Geography. The Macmillan Company. New York, 1952. P. 356.

Corn is not well adapted to the heavy clay soils and has only received limited growth on them. As can be noticed in Fig. 6, the old flood plain of the Twenty Mile Creek has been used to grow large acreages of corn. The lighter soils on the flood plain provide better drainage and seem to be less acidic. Corn is an important element to be included in the make-up of the feed for livestock such as hogs and poultry. Some of this coarse cereal is consumed by the dairy cattle. The applications of heavy commercial fertilizer and deep plowing on the poorly drained sections have aided in improving the land for corn, but the poor physical conditions still seem to prevent any good improvement in the yields per acre.

The fourth crop in acreage is grapes. This crop, although not exclusively confined to the northern part of the township, is grown here due to the fact that this type of fruit cultivation has slowly moved into the area from the sand plain to the north, and also because there is more risk of frost danger in the southern section of the township. Primary deep plowing for grapes is a necessity if there is hoped to be a fairly high yield. Care is also taken to keep the soil as friable as possible. As a result, there has been a slow expansion in grape production.

Orchards have not been planted to any great extent within the township, and their location is rather sporadic, although some concentration may be noted in the better drained areas of the Smithville Clay and along the former flood plain of the Twenty Mile Creek. Apple, pear and plums are the chief types of fruits grown. Some farms on the Haldimand clay plain are actually being

Illus. 9. Holstein cattle, the common type of dairy livestock in South Grimsby township, are seen here grazing on a recently harvested hay field.

Illus. 10. About ten percent of the farms on the Haldimand clay plain are exclusively occupied in the activity of grape and orchard cultivation. The one above is no exception.

entirely used for fruit production and orchard cultivation, as shown in Illus. 10. The cheap price of the land is accredited for the reason why the fruit is cultivated on the poor, heavy clay soils. Once sprayed, the trees need very little attendance, and thus the farmer is free for other activities, such as part-time employment in the closeby large cities. The last important agricultural land use is market gardens. Vegetables, small fruits and flowers are not well suited to heavy soils and, as a result, they are limited to the bottomland of the Twenty Mile Creek. During the days when a dam existed across the creek at Smithville, the land upstream adjacent to the creek was more subject to flooding, especially in the spring. These floods often brought rich overflows of silt and clay to the nearby flood plain. When the dam was removed during the early twentieth century, the rich overlay of silt was used to grow gladiolus flowers, berries and vegetables. Illus. 12 depicts one of the large market gardens north of the Twenty Mile Creek. Applications of manure and commercial fertilizers are made to maintain the fertility of the newly created soil. Two farms are devoted exclusively to the raising of market garden crops. Two-thirds of the market gardening trade takes place in Smithville.

2. Farm Conditions and Marketing Problems

The infertility of the soil is reflected in the condition of the farmsteads. On the whole, many of the farms are of a poor quality. Buildings needing painting and having loose and fallen shingles are quite common. Barns are frequently ramshackle, in fact, the author remembers seeing only a few well-kept barns in

Illus. 11. Orchards are somewhat sporadically located throughout the township. Some struggle against the heavy clay soils while others, such as the one above, profit by the lighter bottomland soils. The Twenty Mile Creek lies off to the right of the picture.

Illus. 12. This market garden north of the Twenty Mile Creek, which lies behind the row of trees in the background, has been very successful on the lighter textured soils of the flood plain.

the whole township. Thirty percent of the farmsteads can be included as just average farms. They are located, for the most part, on the better drained dissected clay plain. There are only a few prosperous farms.

Though there are not many farms in the township which have actually been abandoned, there is much idle land. Many who have left the farm have moved into the closeby large urban centres. The heavy clay soils have proved to be too difficult to cultivate in order to bring in a sufficient profit for a better than marginal living. As a result, many have been attracted to the high wages offered by many urban occupations and left the farm.

There are many people who do not engage in farming as a full time activity. Some participate in weekend farming while pursuing an urban occupation the rest of the week. Never very much land is cultivated, but the crops which are raised and sold help save many from bankruptcy.

Others own lots of a few acres and use them merely as places of residence while they pursue city employment. These people as well as the weekend farmers are employed in various occupations in the city, which range from truck driving to business management. The only preferences that are keeping these "city farmers" in a rural life appear to be the inclination for lower taxes and the dislike of urban living.

The assessment of farms per acre, of course, depends on the quality of the buildings and indirectly on the suitability of the physical background. On the average, farmland in South Grimsby township is assessed at about $30.00 per acre though on the

Illus. 13. Typical farms on the level clay plain commonly exhibit signs of deterioration in the buildings, as seen above. Note the large expanse of idle land in the foreground.

Illus. 14. Farm abandonment has not proceeded extensively as yet but increasingly higher urban wages are being offered and more and more farmers are being attracted to the city. The farm shown above has only been vacated since 1956.

Haldimand clay plain the figure may be as low as $19.00 per acre and on the bottomland, where market gardening takes place, as high as $160.00 per acre. In general, it can be said that the farm values are reflected in the soil conditions.

Success in a rural life depends on the attitude of the people. The average Canadian farmer in South Grimsby is discouraged about present farm conditions, and it has been found by the author that a pessimistic outlook is forecast by many when the subject of the future of farming is brought to their attention. Many of the immigrants refuse to believe that farming will not improve in the future.

Incoming Dutch immigrants have had experience with poor drainage in their native Holland and have through hard work on this land improved its productivity and made a success of farming. Dutch improvement on a former Canadian farm is shown in Illus. 15. It is a rare sight indeed to see a Dutch farm with buildings in a poor state of repair.

The Slavic peoples who emigrated from the West during the depression years have also had limited success with farming techniques.

People from the Jewish colony of Montreal, who set forth to settle in this township in 1953, on the other hand, have not applied proper farming methods to the soil. Few of them believe in constructing artificial drainage ditches or using deep plowing methods to alleviate the drainage. Jews are not successful crop and dairy farmers here, and their farms are run-down and their cattle are of a poor quality. However, these colonizers have only

Illus. 15. Dutch immigrants who have emigrated to the township have purchased many farms and made a success of farming through rigorous work. The above farm, owned by a Dutch Canadian, has shown sufficient profit to have the owner erect new buildings. Note contrast of new buildings with old barn off to the left.

Illus. 16. Many farms with small acreages now only serve as residencies for those who find employment in the closeby cities. Farmsteads are left to deteriorate, as the one above, when cultivating interests have been lost.

been associated with the land for a period of five years, and it is really too early to pass a harsh judgment on their farming methods. On the other hand, from earliest indications, poultry raising is showing signs of prospering under Jewish direction, and within the last two years many chicken and turkey coops have been erected to share in the profits of the newly found business.

There has been a decreased emphasis on dairy farming since the end of World War II. This fact has been brought about as a result of the lack of encouragement given to the industry because of the high cost of fertilizing the crop lands and the low prices offered for the sale of milk by the dairy companies. It has been found that it is just as cheap to buy extra feed as it is to grow it, but the buying of supplement feed, needed for the winter, consumes the slim profits obtained from the sale of milk. Usually grape production or some type of livestock raising helps to add to the farmer's income. The annual sale of milk calves always provides a not too insignificant addition to the farming receipts.

Those who cultivate vineyards or raise turkeys have a seasonal occupation, which only lasts a few months each year. Some work as hired hands during harvest time or obtain some type of employment in places such as feed mills, but the employment opportunities in the surrounding area are few. Most farmers cannot afford extra employees. Thus, the only other source of employment for the seasonal farmer is the city.

Many poultry farmers who raised such fowl as chickens, geese, etc. have a high demand for them all year around, and they remain more secure than those who are occupied with seasonal interests.

Illus. 18 depicts a typical poultry farm in the township.

The sales of farm produce remain a problem in this township for various reasons. As mentioned above, the dairying industry is handicapped by the cost of fertilization and low milk prices. The low milk prices in turn can be attributed to the outlying location of the township. Here there is not too heavy a demand for fluid milk from the large urban centres of Hamilton and St. Catharines. The improvement of Highway 20 recently helped to stimulate the industry, but the dairy companies and the creameries still offer low prices as they know that there is scarcely no other outlet for the South Grimsby farmers' produce. Dairy companies have wanted farmers to install milk coolers. The added expense must be met in order to prevent a decline of dairy company interests in South Grimsby township as a milk source region. The farmers themselves in general have no union to bind them together. Only a few of the Dutch farmers have formed one, but its influence is only superficially felt by the dairy companies.

There is a high reliability on local grain sales. Many who do not participate in dairying still cultivate grain and forage crops as a full time activity. The closeby dairy farmers need extra feeds for the winter, and they are able to be obtained from these grain farmers. The addition of commercial fertilizers and manures by the dairy farmers during different years will lead to the production of a high yield of crops. Thus, the dairy farmers do not have to buy feed from the grain farmers. As a result, many of the grain farmers are left with large quantities of grain, which they hope can be sold to the local feed mills. Often times, they

Illus. 17. These poor lean mixed cattle belong to the Jewish colony from Montreal. Incorporating many dairy breeds into one herd, such as the one above, reduces the quality of the milk.

Illus. 18. A new farm activity is chicken and turkey raising. This fast rising business, which shows fairly good profits, involves very little feed production on the farm. The above establishment is no exception.

are unable to do so because all three township feed mills may be occupied with grinding vast quantities of imported Western grain, which is ordered by yearly contracts. The overwhelming oat crop produced in the summer of 1958 provides an example of such a predicament.

Wineries in St. Catharines, Niagara Falls etc. make fluctuating demands for grapes during different years, depending on the availability of good markets. There is a fluctuating supply of grapes by the fruit cultivators sometimes too. Thus the fruit farmers cannot depend on a steady income.

No easy solutions can be presented to correct all the different phases of marketing, but considerable concentration by the local government is needed in order to alleviate the situation.

Conclusion

Certain qualities of the lacustrine clay soils hinder the development of agriculture in the township. Soil texture is one physical feature which man cannot normally change. He must plan his agriculture to fit the condition as it exists. The soils of South Grimsby are too heavy to successfully grow large yields of most crops. The poor drainage of the soils had to be counteracted with drainage ditches and deep plowing. The acidity of the soil had to be alleviated through the heavy application of lime and manure. Other lacking nutrients had also to be added to the soil.

This is all expensive, especially fertilization, and in order to meet this cost there should be suitable returns in farming. Dairy cattle raising, the best suited agricultural industry, unfortunately has been unable to meet these returns because of the

poor marketing conditions for milk. Other types of livestock raising and cultivation have not solved the problem either.

CHAPTER IV - URBAN AND SUBURBAN LAND USE

South Grimsby township has never contained any large urban development because no main routeways meet within the township, and the township is poor agriculturally. There are also no navigable rivers and no important corridors for land traffic passing through the township.

On the narrow lowland between Lake Ontario and the escarpment in the south is located the main artery of traffic in the Niagara peninsula. The intensive horticultural development on the sand plain was well suited to the light soils. There was thus an attraction for rural settlers, and eventually urban settlement came when there was needed facilities for storing and marketing the produce.

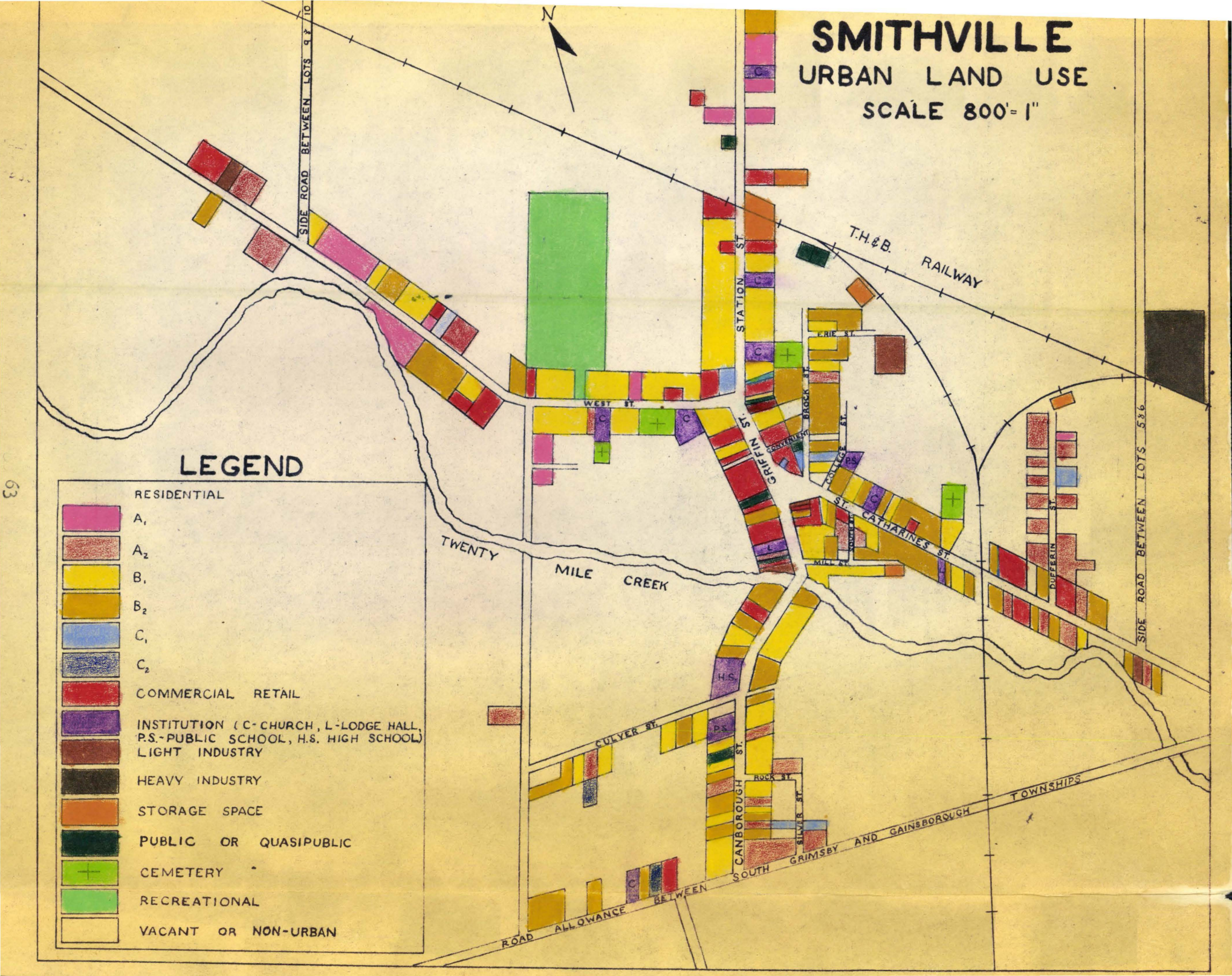
Villages such as Smithville remained completely silent spectators overlooking the Niagara gateway to the north. Number 20 highway was reconstructed into a more efficient traffic route during the post-war era, and this helped to stimulate urban and suburban growth in Smithville itself and along the routeway.

1. Urban Land Use

A. Smithville

(i) Present Shape

The present village's irregular shape dates from the era of early development, and the street pattern has changed little since the last quarter of the nineteenth century. The irregular shape of the village was greatly influenced by the course of the Twenty Mile Creek. West Street and St. Catharines Street follow the creek on its northern bank. (See Fig. 7). When the present grid


SMITHVILLE
URBAN LAND USE
SCALE 800'= 1"
N
SIDE ROAD BETWEEN LOTS 9 & 10
T.H.&B. RAILWAY
STATION ST.
ERIE ST.
WEST ST.
GRIFFIN ST.
BROCK ST.
CONVENIENT ST.
COLLEGE ST.
P.S.
ST. CATHARINES ST.
MILL ST.
DUFFERIN ST.
SIDE ROAD BETWEEN LOTS 5 & 6
TWENTY MILE CREEK
H.S.
CULVER ST.
P.S.
CANBOROUGH ST.
ROCK ST.
SILVER ST.
SOUTH GRIMSBY AND GAINSBOROUGH TOWNSHIPS
ROAD ALLOWANCE BETWEEN
LEGEND
RESIDENTIAL
A1
A2
B1
B2
C1
C2
COMMERCIAL RETAIL
INSTITUTION (C-CHURCH, L-LODGE HALL, P.S.-PUBLIC SCHOOL, H.S. HIGH SCHOOL)
LIGHT INDUSTRY
HEAVY INDUSTRY
STORAGE SPACE
PUBLIC OR QUASIPUBLIC
CEMETERY
RECREATIONAL
VACANT OR NON-URBAN

of roads in the township was imposed on the landscape, a direct north-south route crossing the creek could not be made. The stream had to be crossed below the dam, the presence of the mill-pond preventing a more westerly crossing. Griffin Street turned eastward as a result, and though the dam has been removed, no direct north-south route has been used to cross the Twenty Mile Creek in the village.

Four main streets radiate out from Griffin Street, which contains the commercial core. Other secondary streets project perpendicularly from the four main streets.

(ii) Present Land Use

Smithville is a fourth order centre according to Christaller's classification. Its prime function is to serve its agricultural hinterland. The community has a few gaps in its trade although most important services such as food stores, clothing shops and drug stores are present in the retail commercial section. Wholesale commercial establishments are completely absent. The residential sections of the village are arranged on routes radiating from the commercial core on Griffin Street. Industry remains highly underdeveloped, but there promises to be an intense development of it near the railway in the future. A full range of institutions are also lacking within this juvenile centre.

The present land use of Smithville is shown in Figure 7*. A first glimpse at this map reveals a very disorderly pattern. There were no areas wholly set aside for any designated land use

*Land Use boundaries are not drawn with such accuracy as to coincide with property boundaries.

during the early period of expansion in the village. A retail commercial core can be delineated along Griffin Street, but no strict zoning has prevented sporadic development of retail commerce from occurring along every other street in the village. No present planning pressure exists because of the lack of competition for space. The village is so small, of course, that there still exists adequate space for all types of land use.

The retail commercial concentration along Griffin Street has been established for well over one hundred years. Illus. 19 depicts part of the main business zone.

The retail trade area served is quite large including all of the southern part of Lincoln County. No regional centres have been set up in the rest of the county because Smithville can more than adequately handle all the retail trade needed. The retail trade area has been delineated on the basis of the zones served by the bank, the newspaper and the larger grocery stores and is shown in Figure 8. One advantage of poor soils is that competitive centres lie rather far from Smithville. Competition for Smithville is felt mainly on the west and the east. The western part of the township falls into the retail commercial area of Hamilton, and it is the author's opinion that very few people west of Fulton do business in Smithville other than to pay their municipal obligations. The large city has the commercial advantage of being able to offer wider selections and lower prices to the customer. The eastern section of Gainsborough township comes strongly under the influence of the larger centres of St.Catharines, Welland and Fonthill, which although not having quite the attract-

Illus. 19. The retail commercial concentration along Griffin Street has been established for well over one hundred years. Many of the original buildings of business still exist.

Illus. 20. The improvement and widening of Highway 20, passing through the centre of the township, kept the farming section toward the western border of the administrative area well within the commercial retail trade area of Smithville.

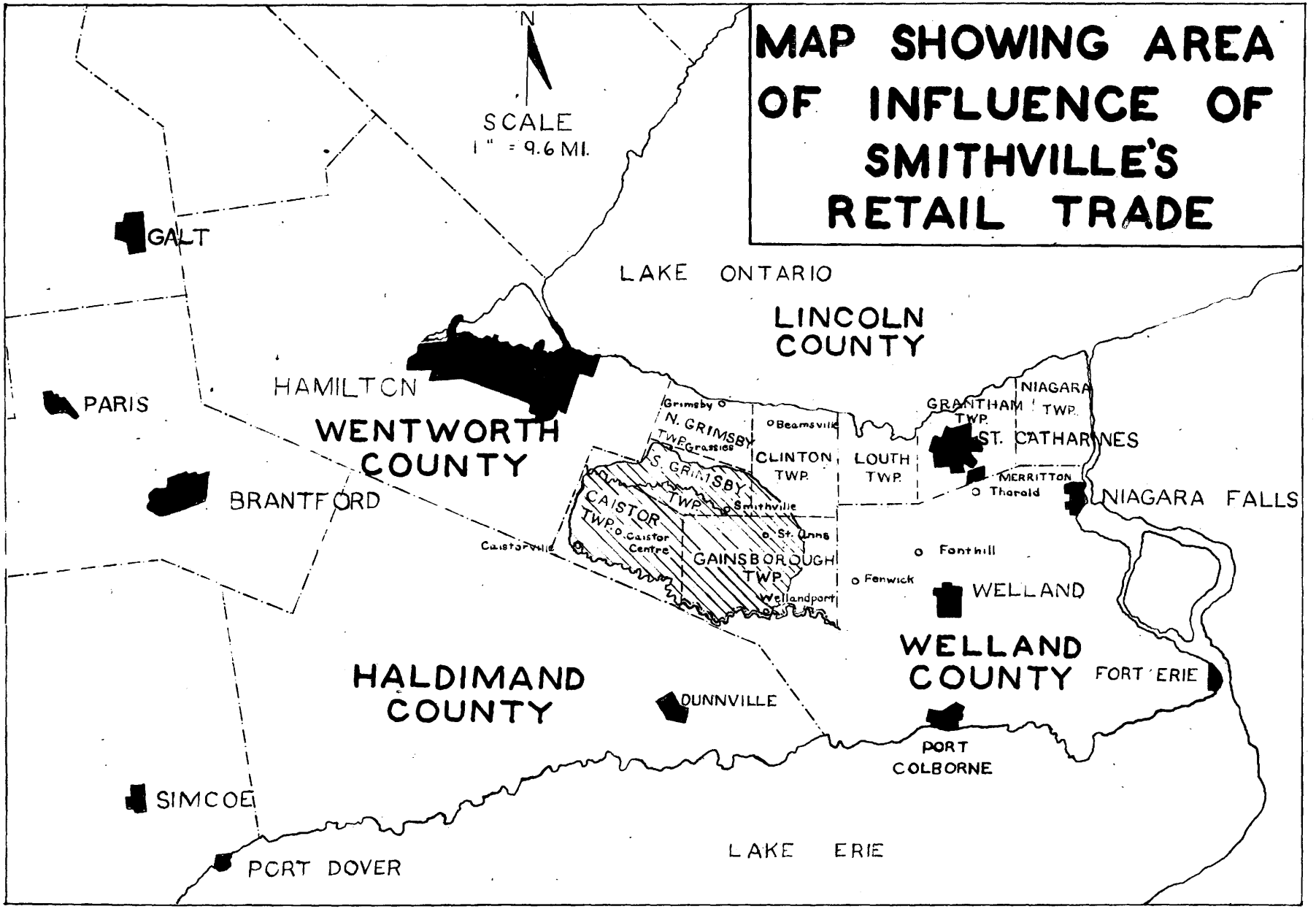

MAP SHOWING AREA OF INFLUENCE OF SMITHVILLE'S RETAIL TRADE
N
SCALE
1" = 9.6 MI.
GALT
PARIS
HAMILTON
WENTWORTH COUNTY
BRANTFORD
LAKE ONTARIO
LINCOLN COUNTY
Grimsby
N. GRIMSBY TWP.
Grassies
Beamsville
S. GRIMSBY TWP.
Smithville
CLINTON TWP.
LOUTH TWP.
CAISTOR TWP.
Caistor Centre
Caistorville
St. Anns
GAINSBOROUGH TWP.
Wellandport
GRANTHAM TWP.
NIAGARA TWP.
ST. CATHARINES
MERRITTON
Thorold
NIAGARA FALLS
Fonthill
Fenwick
WELLAND
WELLAND COUNTY
FORT ERIE
HALDIMAND COUNTY
DUNNVILLE
PORT COLBORNE
SIMCOE
PORT DOVER
LAKE ERIE

FIG. 8

ive power and commercial advantages of Hamilton, still draw much of the retail trade away from the eastern section of the county. There is less influence of retail trade north and south. The topographic obstruction of the escarpment in the north limits the southward influence of Grimsby and Beamsville, but the improvement of north south transportational route to Grimsby still has been responsible for drawing off some business from the northern part of South Grimsby township. The town of Dunnville is too far south to exert much commercial influence north of the Welland River.

If we look at the business zone itself, we can see that most of the retail commercial facilities of a fourth order centre are present. Only a furniture store and a jewellery shop are not included. Supplies are brought in from either Hamilton or St. Catharines because the village lies approximately equidistant from the two cities. Many retail outlets are duplicated in the village, such as grocery stores, hardware stores and other speciality shops, and this has resulted in local competition for these types of businesses. There are no nearby resort areas to create seasonal trade, and business remains at a fairly high level all year around. Some of the retail businesses such as gas stations and auto body shops lie on No. 20 highway, which passes through the centre of the village along West Street, Griffin Street and St. Catharines Street. These enterprises serve primarily many of the transients and as a result, need not be established in the commercial core.

Industry remains underdeveloped and only slightly important in a fourth order centre. The industries, founded in the early

years of the village, such as small foundries, carriage and coffin factories and harness works, have all disappeared with technilogical progress. Two small industries have survived; namely, the grist mill and a Smithville woodworking industry. Many of the former industrial buildings which stand are being used for storage purposes as shown in Illus. 22. The grist mill has, of course, adjusted itself to electrical operations, and the woodworking establishment must now bring in its raw materials from more distant sources. The latter industry overcomes the high transportation cost of bringing in lumber by manufacturing a high quality product such as furniture.

Other industries filtrated into Smithville after World War II each having reasons for doing so. The Ludwig Neckwear and Hosiery Mill, located in the commercial business section, was attracted by low taxes, proximity to urban markets and availability of adequate semi-skilled female labour. The factory produces special types of hosiery and neckwear not duplicated elsewhere in Canada, and there is a good market for these products. The industry has also the advantages of low rail transportation costs because the thread brought in from the supply source at Galt and Cornwall is light weight.

The two newest industries founded in the village are the Green Melk Company and General Refractories Limited. Both are located near the railway because of the need for low cost transportation of their products.

The Green Melk Company, as stated before, located at Smithville because there was a good market for alfalfa meal in

Illus. 21. The old Teeter mill, situated on the Twenty Mile Creek at Smithville, still grinds the grain of the surrounding farms but now through the use of electric power instead of water power. The mill once belonged to Smith Griffin.

Illus. 22. Very few of the former industrial buildings founded when Smithville was "a hive industry" in the 1870's still stand. The one above is now being used for storage purposes.

this section of the Western Dairy Belt. The alfalfa is brought in from an area which extends for a fifteen mile radius out from the village. Fifty percent of the alfalfa comes from the township itself. The labour supply needed is only thirty-five men and sixty percent of them live in Smithville or the surrounding area. A large portion of the alfalfa is sold to the more important feed companies, such as Ralston Purina Limited and Toronto Elevator Limited, but minor quantities of the forage crop are also sold to the local feed mills, such as the one at Fulton.

General Refractories Limited, depicted in Illus. 24, is the first heavy industry to be established in Smithville. The present industrial site was chosen by this manufacturer of fireproof materials because of the opportunity for lower taxes and yet the advantage of being near the primary iron and steel industries in Hamilton, with whom it carries on a large volume of business. Only about twenty-five men, nearly all unskilled, are employed because of the high amount of automation within the plant. The location of raw materials was not a factor considered in the choice of site because special types of sands, chrome and magnesite had to be brought in from world wide sources. This process involved high transportational costs anyway. Magnesite ore is shipped from as far away as Austria, South Africa and the Phillipines. A lakeshore location did not have to be considered because there was no need for getting rid of vast quantitites of waste by dumping it into a lake. The refractory brick produced is also marketed for use on the inside of copper smelters, glass furnaces etc. as well

Illus. 23. The Green Melk Company Limited, one of the newest industries founded in the village, dehydrates large quantities of alfalfa brought in from the surrounding area.

Illus. 24. General Refractories Limited, a manufacturer of fireproof materials and the first heavy industrial concern to be established in Smithville, was opened in 1956.

as within the open hearth and blast furnaces of the primary iron and steel industries.

The residential sections of the village occupy the greatest percentage of the land. Three main classes of residential buildings have been identified in Smithville and each again is subdivided into two types.

A Class homes include residencies of recent or post war development.

A_1 Class sub-type comprises all new residencies worth $15,000 or more. They consist of clapboard, brick or cut stone construction and are usually situated on large well landscaped lots.

A_2 Class sub-type comprises all new residencies worth less than $15,000. They consist also of clapboard, brick or cut stone construction, but the size of house and the property included is much smaller and there is less artistic landscaping.

B Class homes include all those older residencies which have been well preserved.

B_1 Class sub-type comprises the older well-kept homes of many of the middle class people. All these homes consist of clapboard construction and are usually situated on fairly well landscaped lots.

B_2 Class sub-type comprises the residencies which are only fairly well kept. There are some signs of deterioration in the buildings. These homes are constructed of brick, clapboard, or stucco and are usually situated on small lots where little attention is paid to landscaping.

C Class homes include all those older residencies, which have fallen into a poor state of repair.

C_1 Class sub-type comprises all those older homes that have fallen into a condition of disrepair but which are still able to be restored.

C_2 Class sub-type comprises all those older homes that have fallen beyond the state of repair. Also included with this type of home are shacks, trailers, etc.

A fourth order centre still contains a haphazard residential arrangement because there is not a very high volume of commerce

or industry in the village to bring out a class distinction, and thus a residential segregation on an economic basis. The A Class homes are located usually in surveys or in separate properties on the fringe of the village where land was available for post-war development. A liberal number of the people in the A Class homes commute to the closeby large urban centres and have no close connection with the business section of Smithville. Many people of the A_1 Class sub-type homes are employed as business executives while those in the second sub-type of residence are often employed as industrial workers. About 15% of the village's homes are A Class residencies so that probably about 15% of the people who live in the village are commuters. The B_1 and B_2 homes are the most numerous. Many of the B_1 homes belong to people who are engaged in retail business, and these houses, as a result, have congregated around the commercial core. A large number of retired farmers occupy the less expensive B_2 homes, but some of those who are employed in the village industries also live in this type of residence. There are only a few C Class type homes in Smithville, and those which are present have only a sporadic arrangement.

Not all types of institutions are established in a centre of this size. No government buildings or a hospital exist, and the villagers usually go to Hamilton or St. Catharines for these services. Seven churches, two public schools, two lodge halls and one high school are among the present establishments. All the major religious bodies are represented in the churches of the village. The founding of a Dutch Reform Church recently shows the increasing influence being exerted by this ethnic group in the

Illus. 25. Typical A_1 class residencies situated on the fringe of Smithville village. Note the large well landscaped lots.

Illus. 26. Many of the B_1 homes belong to some of the long time residents of the community. This well kept house is located in the central business section on Griffin Street.

community and township affairs. An interesting problem occurred when the present new high school was being planned. A paper mill at South Pelham in Pelham township, which lies adjacent to Gainsborough township, employed many inhabitants of the latter township. Many of the workers sent their children to a high school near the paper mill site, and few students could be congrgated within the remainder of south Lincoln County to make economically worthwhile the construction of a larger Smithville high school. The influence area of the high school is smaller than that of the retail trade area.

The village contains some public and quasipublic buildings, such as a police station, firehall, railway station etc., plus other facilities providing space for storage and recreational purposes. The water used for domestic purposes is obtained from a well. There is no centralized sewage system in the village, and septic tanks are being used. Before a much further expansion of the village can take place, there will have to be developed larger water retaining facilities and a central sewage system.

B. Hamlets

(i) Grassies

This hamlet, popularly known as Grassie, is a sixth order centre according to Christaller's classification and is located on the northern border of the township. The only notable businesses found in this crossroad settlement, show in Fig. 9, are three general stores, a feed mill and one gas station. The strong east-west orientation of the small community reveals the importance of traffic through the Niagara peninsula on this paved

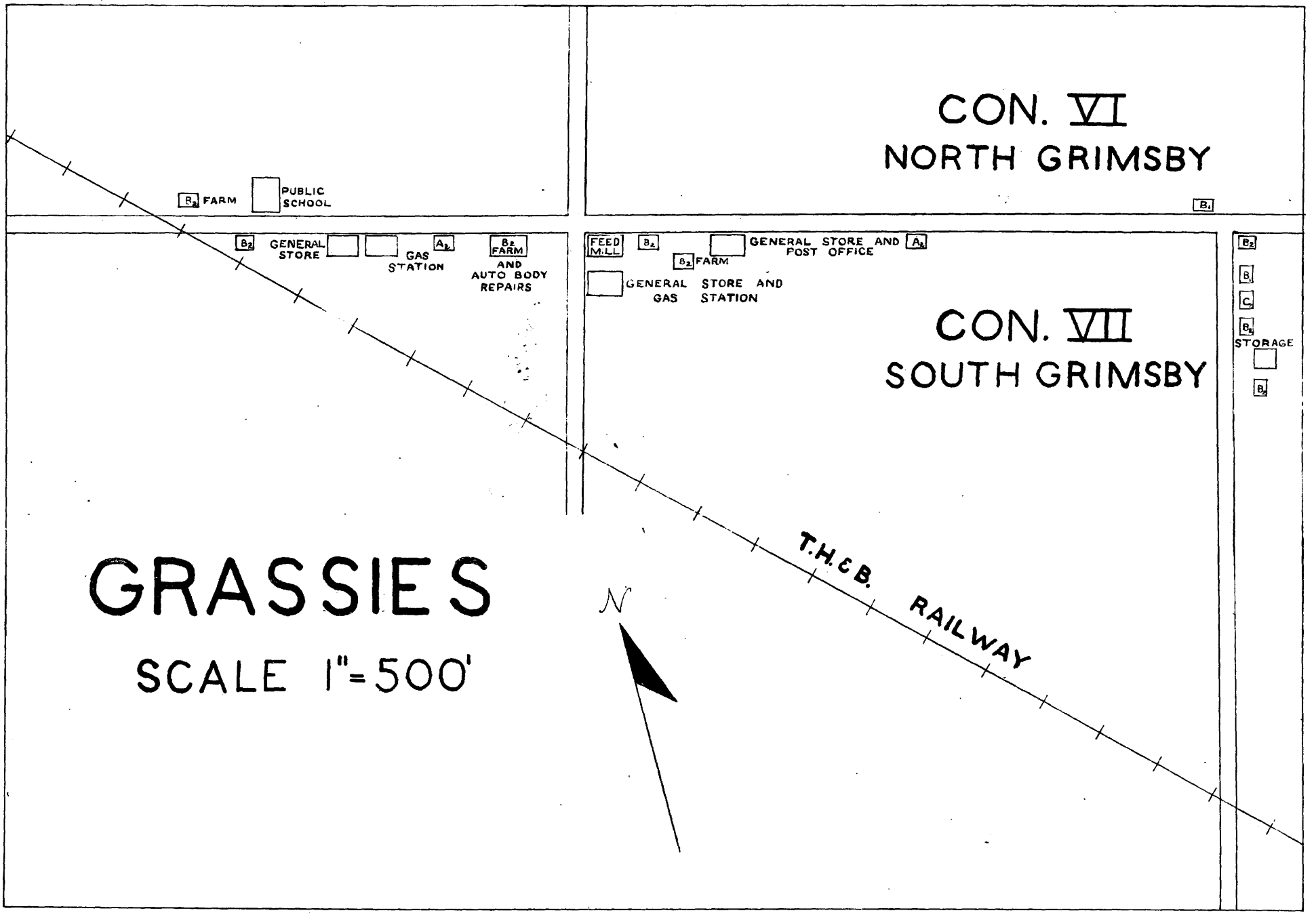

CON. VI
NORTH GRIMSBY
B1
B2 FARM
PUBLIC SCHOOL
B2 GENERAL STORE
GAS STATION
A2
B2 FARM AND AUTO BODY REPAIRS
FEED MILL
B2
B2 FARM
GENERAL STORE AND POST OFFICE
A2
GENERAL STORE AND GAS STATION
CON. VII
SOUTH GRIMSBY
B2
B1
C2
B1
STORAGE
B2
GRASSIES
SCALE 1"=500'
N
T.H.&B. RAILWAY

FIG. 9

road. A paved north-south route through the hamlet has some influence on traffic because it gives access from No. 20 highway northward to the town of Grimsby.

The trade area of the general stores is purely local, and wholesale supplies are easily obtained from Hamilton and St. Catharines.

The feed mill grinds some local grain, but most of the grain ground comes from the Prairie provinces. Western grains, brought through Port Colborne, have a better quality than the local product, and as a result, they are in greater demand.

The same residential classification has been applied to Grassies as to Smithville. B_2 houses, which predominate, are nearly all occupied by retired farmers or people who are employed in local businesses. Only two A_2 type homes have made their appearance, but in the author's opinion, there is a good possibility for more A_2 suburban development in the future. This will occur because of the presence of lower taxes and good accessibility of the paved roads to the large conurbation to the west and the heavily travelled Queen Elizabeth highway to the north.

(ii) Fulton

This sixth order centre, located on Highway 20, consists of a few houses, a gas station, a general store and a feed mill. The settlement lies on the border of the trade area of Smithville and as a result, is able to supply some retail trade services for the local farmers, especially those to the west of Smithville as they live outside its trade area. Many of the farmers who come to the feed mill do much of their shopping in the Fulton general

store. Most wholesale supplies are brought in from Hamilton. The feed mill here, like the one at Grassies, receives its grain from the Prairie provinces.

(iii) Other centres

Kimbo, situated on No. 20 highway between Smithville and Fulton, is comprised of a few houses congregated around a Methodist Church. It was once a commercial centre. A few new suburban homes have been established here because of the presence of lower taxes and good access to the larger urban centre to the west.

Grimsby Centre, located on the northern border of the township, lies at the point of crossing of the Grassies side road and the main road north from Highway 20 to the town of Grimsby. The crossroad settlement is comprised of a school and a few houses. The paving of the Grassies side road has improved its east-west accessibility, and in the future there is a good possibility for suburban development.

Basingstoke as a settlement does not exist. A local general store serving part of northern Caistor township as well as a portion of the southern part of South Grimsby township was destroyed by fire a few decades ago. Only one desolate farmhouse remains now to remind one of the past existence of the centre.

2. Suburban Land Use

Suburban growth in the township, as shown in Fig. 10, still remains in the infantile stage of ribbon development. There are no suburban surveys established outside Smithville village.

Formerly, suburban growth had only been sporadic and nearly

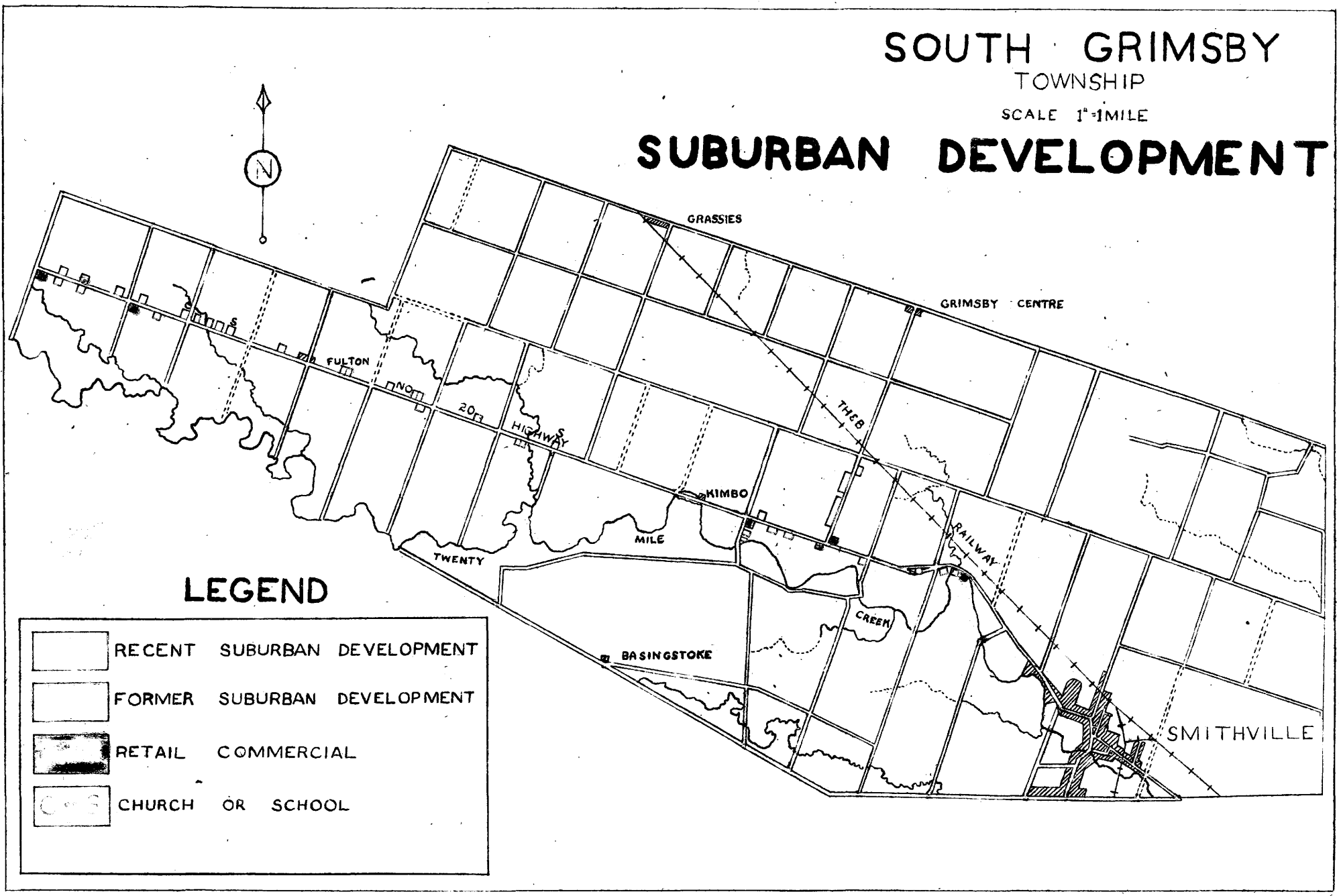
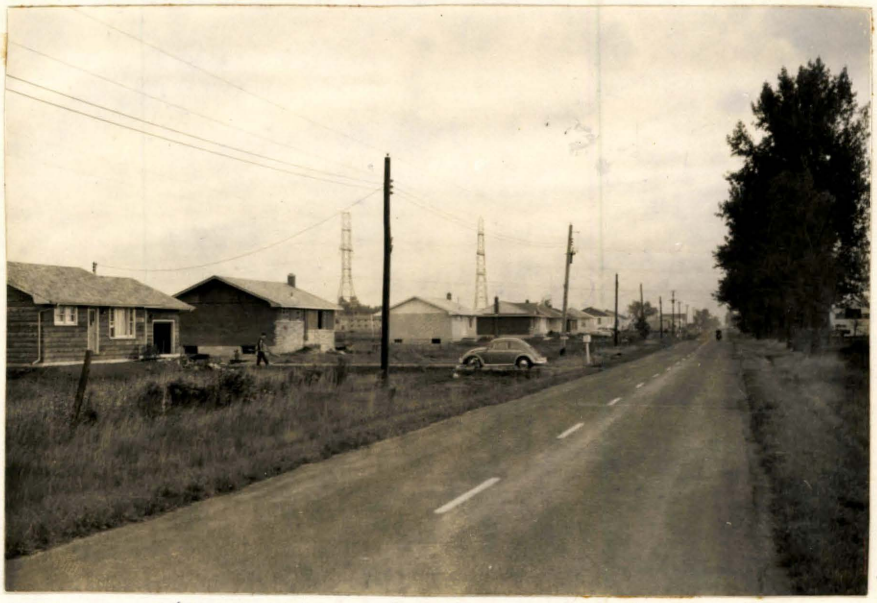

SOUTH GRIMSBY
TOWNSHIP
SCALE 1"=1MILE
SUBURBAN DEVELOPMENT
N
GRASSIES
GRIMSBY CENTRE
FULTON
NO
20
HIGHWAY
THEB
KIMBO
RAILWAY
MILE
TWENTY
CREEK
BASINGSTOKE
SMITHVILLE
LEGEND
RECENT SUBURBAN DEVELOPMENT
FORMER SUBURBAN DEVELOPMENT
RETAIL COMMERCIAL
CHURCH OR SCHOOL

FIG. 10

Illus. 27. Grassies, a crossroad settlement on the northern border of the township, contains a few small businesses. A feed mill in the centre background and a general store off to the right are depicted.



Illus. 28. Ribbon development along the increasingly suburbanized Grimsby road.

all confined to land adjoining Highway 20. The present day poor quality of the homes, sometimes shacks and trailers, suggests that the people have a low income. Many are employed in low paying jobs in the city and have moved here like the new suburban dwellers to avoid high taxes and yet still enjoy good accessibility to the hearby large urban centres.

There has been a further influx of suburbanites recently as people continue to move southward from the Ontario plain as well as eastward from Hamilton. Many suburban homes have lined themselves along the important north-south transportation route of the Grimsby road. The owners are employed in the growing businesses and industries of Grimsby to which they have oriented their homes rather than to Hamilton like the suburban dwellers on Highway 20. The suburbanites who have lined themselves along the Grimsby road though are still close to Highway 20 in order to enjoy good east-west access.

A few commercial establishments have also sprung up along No. 20 highway to service the transients. These are restaurants, motels or gas stations. Truckers, tourists and commuters supply most of their business.

It is still too early, however, to tell the effects of suburban growth in the township until the present stage of development passes infancy.

Conclusion

Slow urban growth in South Grimsby township has been partially due to the poor condition of the agriculture, but it is doubtful that even if the surrounding farmlands were prosperous, there

would be any large urban agglomeration. Even a rich agricultural area cannot support a town whose population is much more than a few thousand when the town's prime function is to act as a supply centre for the surrounding farm population. There must be important trade routes focusing on an urban centre to help develop commerce and so bring in more capital. Once this happens, it is only a matter of a short time before more housing, industry and other forms of development enter the urban centre.

The village of Smithville is the only urban community of any appreciable size, not only in the township, but also in the southern part of Lincoln County. As a result, the commercial section of the village serves an extensive trade area. This fourth order centre has some industrial development, and residential growth has remained haphazard and sporadic. A recent population increase has followed the improvement of the much travelled Highway 20 and the beginning here of suburban growth.

SUMMARY AND CONCLUSION

1. Summary

South Grimsby township has no great physical diversity, but agriculture and urban developments have been affected by the nature of the physical environment.

Unfortunately for the township's people one physical element has been responsible for the township's slow growth. This is poor soils. No topographic barriers exist in the township. The slight swell of the Niagara Falls moraine and the dissected clay plain would scarcely be noticed by the casual observer. No outcropped areas of the two Silurian bedrock structures - the Lockport and Guelph formations - hinder agricultural development. The clay deposits in pro-glacial Lake Warren during the recession of the Wisconsin continental glaciation were responsible, of course, for the creation of the present soil conditions. A rainfall deficiency during the heated summer months discourages high crop yields in the period of greatest water need, but the injurious condition of the extremely acidic, high carbonated and poorly drained soils would not be affected by any favourable moisture additions. Elm, maple and swamp oak are adapted to all sections of the poorly drained clay plain while white pine favours the externally better drained Smithville Clay soil type. Four distinct land types exist in the township, but only two have any large areal extent. These, the level clay plain land type and the dissected clay plain land type, only differ in respect to their drainage capabilities. There is better external drainage on the latter.

The Neutral and Iroquois Indians recognized the poor quality

of the soils during the pre-historic period. During the latter periods of settlement, others made the same discovery. The village of Smithville was founded to serve an agricultural hinterland, but it grew too slowly when farming interests declined. The low number of Loyalist and British settlers were supplemented with others ethnically different after the days of early settlement. A somewhat marked change occurred after the Second World War when many Dutch immigrants and a Jewish colony from Montreal came into the township.

Agricultural interests are mainly in dairying, but fruit farming and other forms of livestock raising are strongly supporting secondary interests. Forage crops and oats are grown on a large percentage of the agricultural land because they are needed as feeds in the dairying industry. Large acreages of pasture and idle land also exist because it has been found uneconomical to bring the heavy clay soils under fertilization. While many farmers are devoting their complete time to farming, an increasing percentage are using farmland to serve as sites for roughshod weekend farming and places of residence. Marketing conditions are not good for dairy products, grains or fruits, especially for the latter two which fluctuate according to seasonal demands. Many of the dairy farmers must press for milk sales because they are located on the margins of the milksheds of Hamilton and St. Catharines.

Smithville, a fourth order urban centre and once a prosperous agricultural village in the 1860's and 1870's, has declined in importance as disinterest in farming in the surrounding agricultural hinterland took place. For the last three-quarters of a

century, the village has remained stagnant with relation to population growth. Only a recent influx of suburban development has caused some gradual revival of population growth. The village trade area serves a large portion of south Lincoln County because other centres in this region lack the same commercial facilities.

No other urban community of any comparable size exists in South Grimsby township. Grassies and Fulton, two sixth order centres, are established settlements on the main east-west transportation routes in the township, the Grassie Road and Highway 20, respectively.

Suburban development in the township itself has proceeded in response to these influential transportation routes as well as lower taxes.

2. Conclusion

Poor soils have been responsible for the disinterest in agriculture and the low development of urban growth. Urban centres outside the township like Hamilton and St. Catharines have grown rapidly, and by the mid twentieth century, their financial, commercial and industrial influences have come to the outskirts of South Grimsby township. Today, there is a decided conflict between agricultural and urban interests, in which the latter is gaining control in the township because of the poor physical basis for agriculture. There can be little incentive for intense agricultural development when poor soil conditions prevent high cash crop returns.

Dairying, although the prime farming interest, suffers because of the high cost of supplying feeds to the milk cows.

Thus, the dairy farmer's income is low, and the buying of commercial fertilizer is too expensive to be used on crop lands.

Therefore, some of the farmers now concentrate on those types of farming which use little land, such as chicken and turkey farming. The large quantities of feeds that are needed are purchased. Also, only small acreages need to be planted in vineyards and orchards if sufficient profits are to be received.

Many of the people occupied with those types of farming which use little land find part-time employment in the city. Others on the farm have closer urban ties. They use the farms either for residential purposes or for some roughshod weekend cultivation. These people would move to the city but dislike urban living and the high city taxes.

Industrial interest has taken place at Smithville and the new industries are attracting many off the farm because of the high wage offers. But Smithville certainly cannot compete with the services offered by the larger cities. The village's purpose was to serve its agricultural hinterland,but this function has declined in importance as farming interests fell.

Since no pressure has developed to keep agricultural growth at a high standard, and the surrounding large urban centres overshadows the township's economy, more and more people will become dependent on the nearby cities. As the larger cities expand their trade areas, the pressure for renewed agricultural interest will be felt more intensively in the township, but only a few farmers will be able to economically afford the upkeep of farming. Farming interests will gradually succumb in the township as this

development takes place. Many of the farmers may move to the city and hold their lands for future subdivision into building lots. The sale of farmlands for subdivision will prove to be more profitable for the farmer than struggling for a hard earned income in the field of agriculture.

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APPENDIX A

FACTOR USED IN DETERMINING THE CLIMATIC STATISTICS

Height of South Grimsby township above sea level is about 650'.

Height of Lake Erie above sea level is about 565'.

Height of Lake Ontario above sea level is about 250'.

Thus Lake Erie is 85' (650'-565') below the general elevation of South Grimsby township and Lake Ontario is 400' (650'-250') below the general elevation of the township.

As a result, the moderating influence on the climate by Lake Ontario is only 85/400th or 17/80th of that by Lake Erie.

The number 17/80th is used as the factor in interpolating the difference between the climatic statisics of the Lake Erie Climatic Belt and that of the Niagara Fruit Climatic Belt.

APPENDIX B

General Farming Statistics

Year	Total Population	Farm Population	Farm Operators	Areas of Farms in acres	Occupied Farm Size in Acres					
					0-10 ac	11-50 ac	51-100 ac	101-200 ac	201-299 ac	300* ac and ove
1851*	2,248	-	278	30,096	43	30	94	86	25	0
1861*	3,005	-	317	33,685	14	69	133	68	33	0
1871*	3,123	-	368	32,522	29	85	160	83	11	0
1881*	2,416	-	413	30,662	89	85	155	78	6	0
1891	1,610	-	287	17,941	178	48	97	54	1	0
1901	1,379	Statistics given only by counties								
1911	1,389	-	273	18,073	44	75	117	37	0	0
1921	1,426	-	215	17,003	12	51	115	37	0	0
1931	1,428	817	212	17,905	-	-	-	-	-	-
1941	1,496	797	218	17,612	13	59	100	42	4	0
1951	1,726	909	204	18,141	11	60	94	33	6	0
1956	2,042	923	202	17,444	15	60	90	27	9	1

*Statistics include North and South Grimsby townships which were still undivided at this time.

APPENDIX C

Crop Statistics (in acres)

	Improved Land					Unimproved Land		
Year	Total	Under Crops	Summer Fallow	Pasture	Other	Total	Woodland	Other
1851*	14,737	9,425	-	5,161	-	-	-	-
1861*	18,768	13,362	-	5,023	-	-	-	-
1871*	22,126	16,792	-	4,403	-	-	-	-
1881*	21,835	17,346	-	2,798	-	-	-	-
1891	14,693	11,916	-	2,278	-	-	3,248	-
1901	Statistics given only by counties							
1911	15,573	11,687	589	-	-	2,500	1,356	-
1921	14,806	9,644	1,603	2,974	-	2,197	1,676	521
1931	15,490	11,800	1,331	2,189	-	2,415	1,487	928
1941	15,410	10,451	736	3,221	598	2,202	1,453	749
1951	15,794	10,967	727	3,563	537	2,347	1,532	815
1956	15,425	10,425	626	3,563	811	2,019	1,261	758

*Statistics include North and South Grimsby townships which were still undivided at this time.

APPENDIX D

Crop Statistics (in acres)

Year	Field Crops	Wheat	Barley	Oats	Rye	Other Grains	Hay	Other Fodders	Potatoes	Orchard
1851*	-	3,775	188	1,442	46	808	-	-	109	151
1861*	-	3,692	970	2,108	211	1,144	-	-	230	383
1871*	-	3,891	19,880 bu.	39,492 bu.	-	-	5,302	-	135	931
1881*	-	4,103	13,060 bu.	72,774 bu.	-	-	4,002	-	160	-
1891	8,714	2,110	270	2,120	-	-	3,877	-	39	499
1901	Statistics given only by counties									
1911	11,354	1,427	232	3,192	91	195	5,052	411	91	406
1921	9,644	1,066	162	2,389	54	369	5,229	-	42	-
1931	11,518	645	221	2,962	46	1,490	5,476	-	25	273
1941	10,391	929	32	2,352	17	371	6,161	495	14	406
1951	10,447	1,239	-	2,623	-	118	5,860	606	-	-
1956	-	851	- 4	1,985	4	53	5,943	809	3	-

*Statistics include North and South Grimsby township which were still undivided at this time.

APPENDIX E

Farm Animal Statistics

Year	Horses	Total Cattle	Milk Cows	Beef	Others	Sheep	Swine	Hens and Pullets	Other Fowl
1851*	863	2,565	1,151	-	-	3,494	2,750	-	-
1861*	1,085	2,339	1,170	-	-	3,951	2,343	-	-
1871*	-	-	-	-	-	-	-	-	-
1881*	-	-	-	-	-	-	-	-	-
1891	815	1,504	764	-	740	924	780	7,517	14
1901	Statistics given only by counties								
1911	-	-	-	-	-	-	-	-	-
1921	-	-	-	-	-	-	-	-	-
1931	518	1,829	1,040	-	789	929	859	22,720	1,558
1941	495	2,076	1,445	41	590	538	1,388	19,531	1,802
1951	256	2,404	1,610	148	646	234	1,156	6,829	26,611
1956	91	2,820	1,601	-	-	232	825	51,848	5,781

*Statistics include North and South Grimsby townships which were still undivided at this time.

APPENDIX F

Ethnic Origins

Year	English	Scot	Irish	Others	French	Dutch	German	Polish	Ukrainian	Hungarian	Czech	Others
1851*	108	52	196	-	14	-	2+	-	-	-	-	-
1861*	186	81	199	-	5	-	27+	-	-	-	-	-
1871*	1,162	416	472	-	52	-	1,015	-	-	-	-	-
1881*	1,739	367	391	-	27	15	800	-	-	-	-	-
1891	-	-	-	-	-	-	-	-	-	-	-	-
1901	602	187	147	33	24	87	279x	-	-	-	-	20
1911	650	223	196	11	26	3	274	-	-	-	-	6
1921	874	163	147	21	8	58	134	-	-	-	-	19
1931	623	230	135	52	25	176	108	11	6	1	8	44
1941	700	178	128	33	19	138	85	38	43	31	61	42
1951	-	-	-	-	-	-	-	-	-	-	-	-

+Includes Dutch

xIncluds Swiss

*Statistics include North and South Grimsby townships which were still undivided at this time.

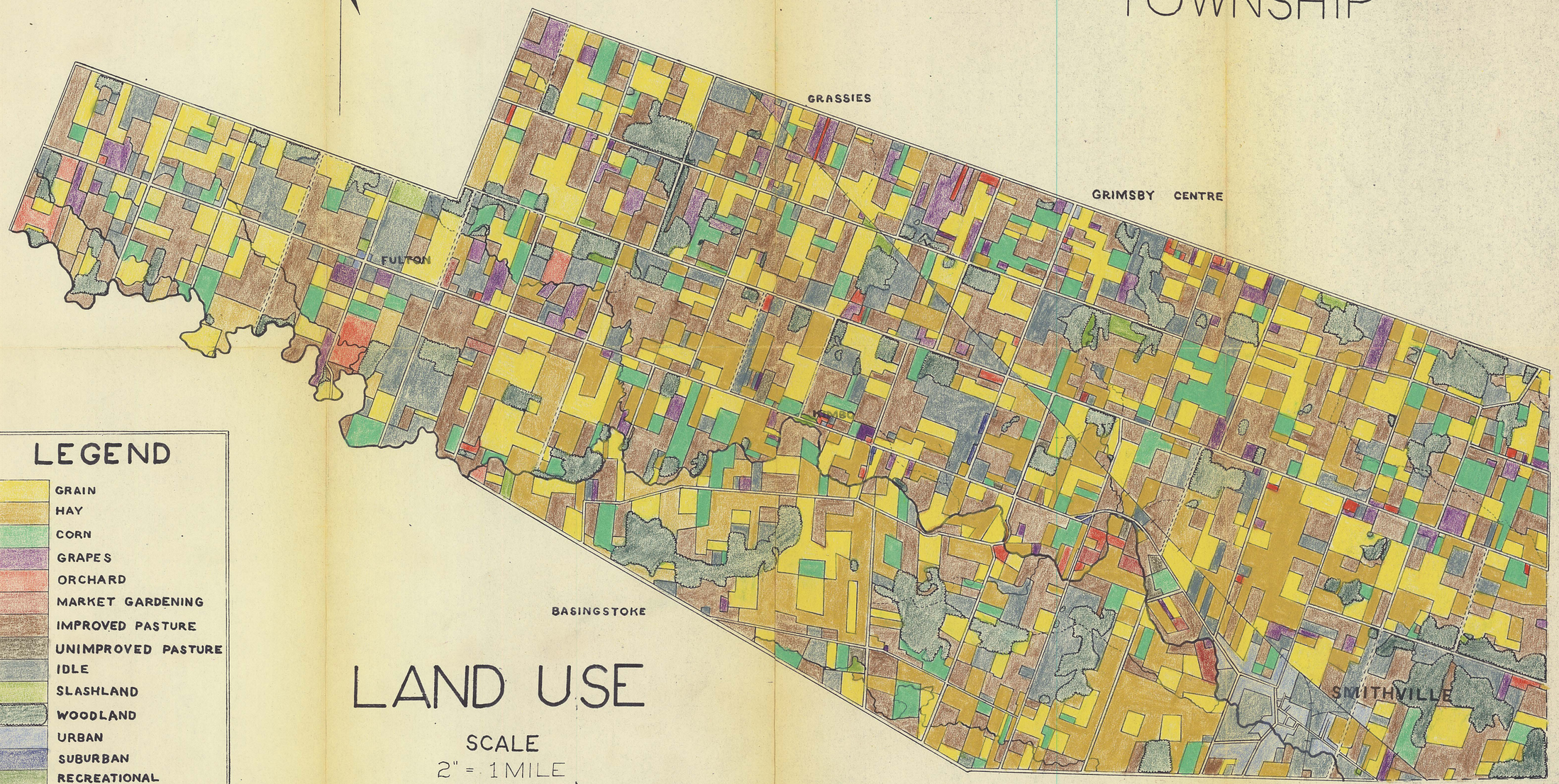
APPENDIX G

Religious Compositions

Year	Anglican	United Church	Presbyterian	Baptist	Roman Catholic	Jewish	Lutheran	Church of Christ Disciples	Greek Orthodox	Others
1851*	397	482	177	71	224	-	-	-	-	-
1861*	955	927	329	117	198	-	7	-	-	-
1871*	676	1,119	437	138	-	-	12	-	-	-
1881*	661	922	541	276	173	-	27	-	-	-
1891	153	792	307	34	61	-	14	88	-	121
1901	112	612	333	40	63	-	28	98	-	93
1911	121	634	313	47	76	66	22	105	-	5
1921	207	642	325	52	85	4	9	38	-	64
1931	229	607	29	64	103	10	10	58	4	42
1941	224	692	209	53	163	4	46	-	20	-
1951	288	701	173	50	199	40	57	-	93	135

*Statistics include North and South Grimsby townships which were still undivided at this time.

SOUTH GRIMSBY
TOWNSHIP



LEGEND

- GRAIN
- HAY
- CORN
- GRAPES
- ORCHARD
- MARKET GARDENING
- IMPROVED PASTURE
- UNIMPROVED PASTURE
- IDLE
- SLASHLAND
- WOODLAND
- URBAN
- SUBURBAN
- RECREATIONAL

LAND USE

SCALE
2" = 1 MILE

FIG. 6