THE POPULATION GEOGRAPHY OF THE NIAGARA PENINSULA

by

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INTRODUCTION

There is a definite need for population studies to be carried on in geography. The lack, or inadequacy, of census figures however limits the amount of analyzing and interpreting of changes and trends that occur within a specific region. When the number and quality of population figures available remain altogether inadequate for the geographer, then field work should accompany his study to transcend the limitations imposed by such inadequacies.

This study shall endeavour to examine the population geography of the Niagara Peninsula. After a consideration of how the environment has evolved and affected the early settlers entering the region, then we shall turn to the twentieth century. Here, some of the problems developing in the Peninsula shall be examined: the actual densities and distribution; the rural scene; the remarkable urbanization; varying rates of growth; and the foreign elements of immigration.

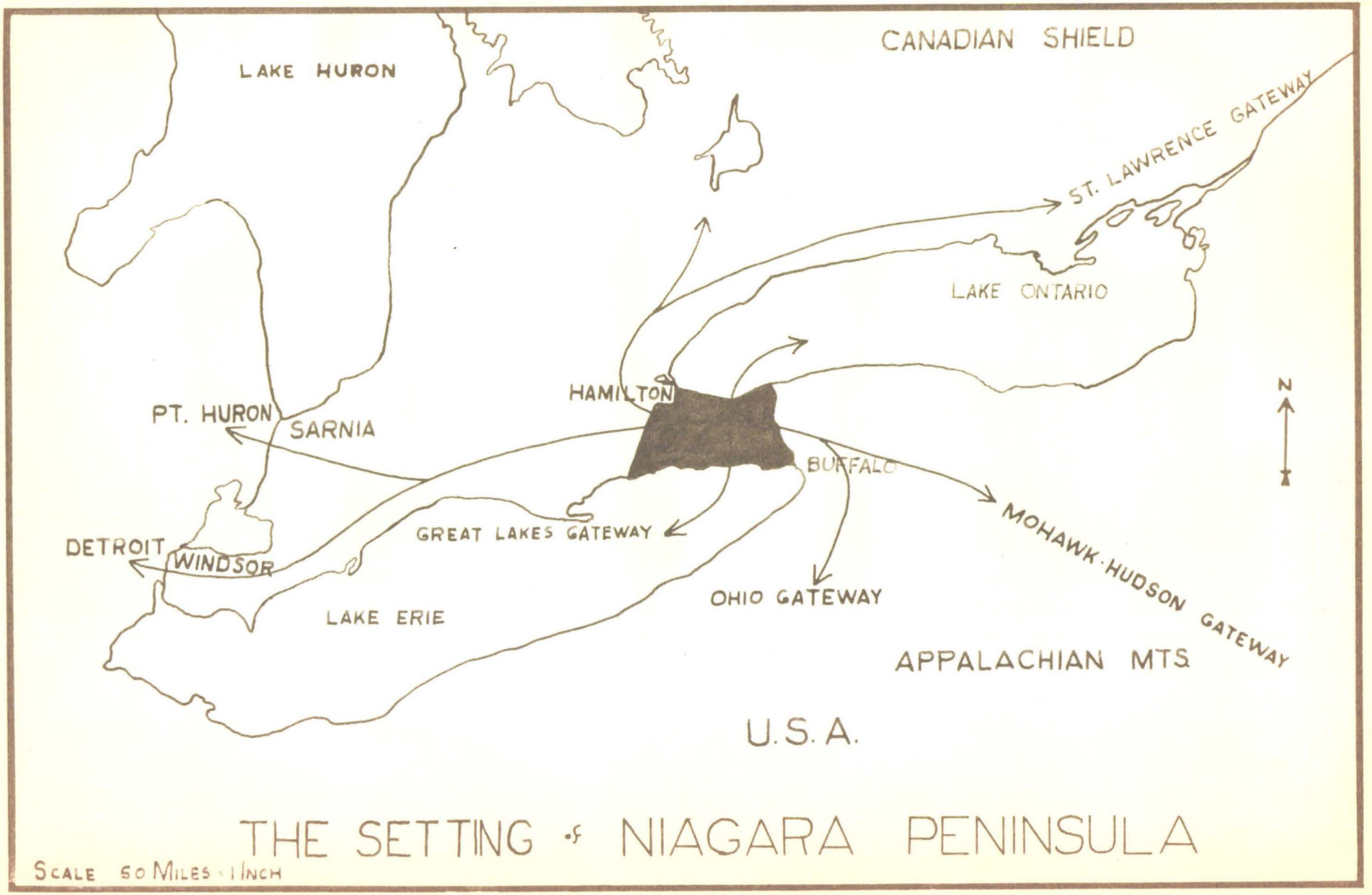
CANADIAN SHIELD
LAKE HURON
ST. LAWRENCE GATEWAY
LAKE ONTARIO
HAMILTON
PT. HURON
SARNIA
BUFFALO
N
DETROIT
WINDSOR
GREAT LAKES GATEWAY
MOHAWK-HUDSON GATEWAY
OHIO GATEWAY
LAKE ERIE
APPALACHIAN MTS.
U.S.A.
THE SETTING of NIAGARA PENINSULA
SCALE 50 MILES = 1 INCH

FIG. 1

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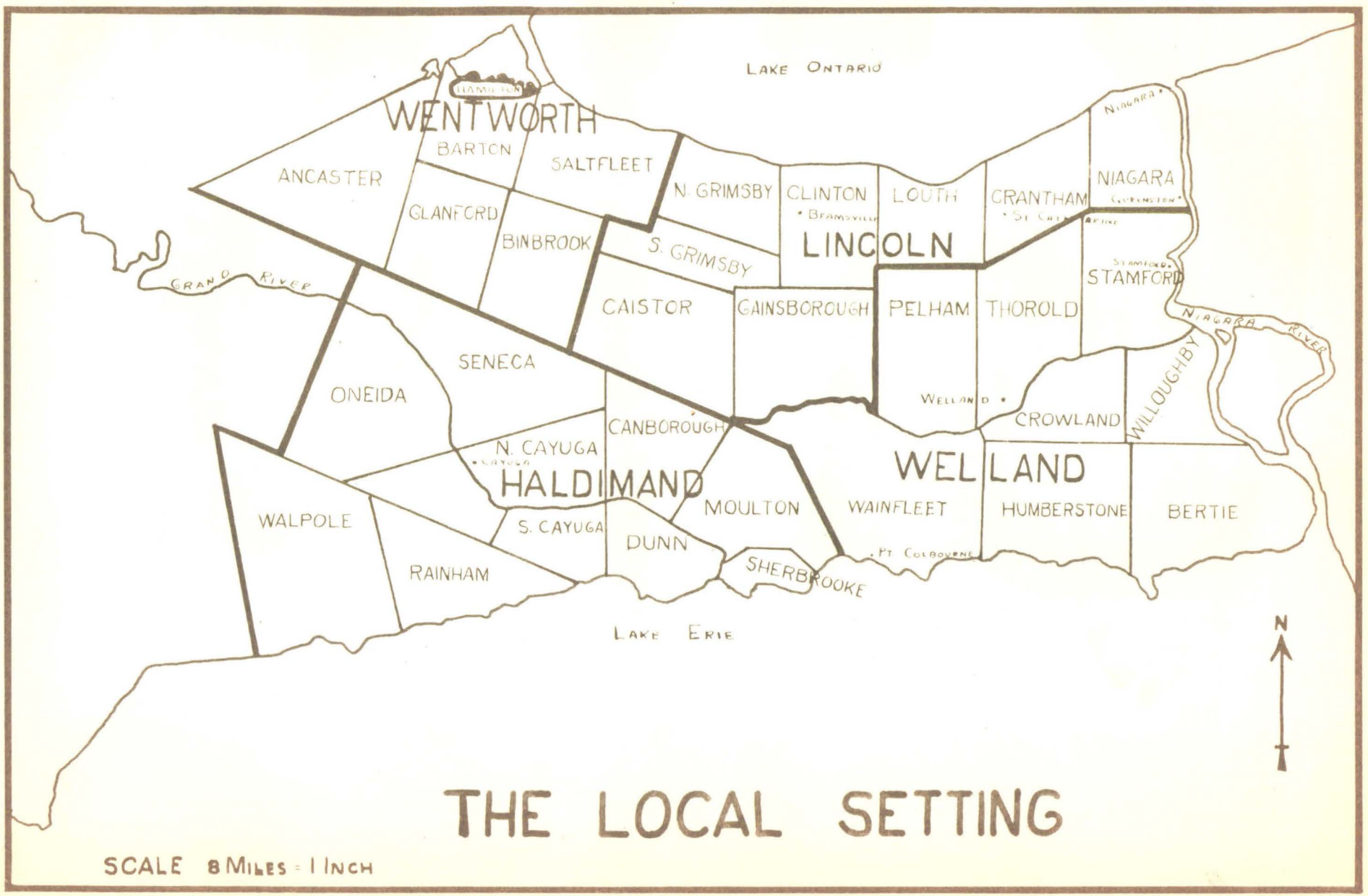

LAKE ONTARIO
HAMILTON
WENTWORTH
BARTON
ANCASTER
GLANFORD
BINBROOK
SALTFLEET
N. GRIMSBY
S. GRIMSBY
CLINTON
BEAMSVILLE
LOUTH
CRANTHAM
ST CATH
NIAGARA
GRIMSTON
LINCOLN
STAMFORD
GRAND RIVER
CAISTOR
GAINSBOROUGH
PELHAM
THOROLD
NIAGARA RIVER
SENECA
ONEIDA
CANBOROUGH
N. CAYUGA
HALDIMAND
WELLAND
CROWLAND
WILLOUGHBY
MOULTON
WAINFLEET
HUMBERSTONE
BERTIE
WALPOLE
S. CAYUGA
DUNN
RAINHAM
SHERBROOKE
PT COLBORNE
LAKE ERIE
N
THE LOCAL SETTING
SCALE 8 MILES = 1 INCH

FIG. 2

THE POPULATION GEOGRAPHY OF NIAGARA PENINSULA

G E O L O G Y

The Niagara Peninsula is located in the Central Paleozoic Lowlands of North America, lying between the mineraliferous old rocks of the Canadian shield to the north and the rich agricultural-producing soils of the younger Appalachian rocks to the south. Besides the benefits that it receives from its proximity to both these regions, it has certain local characteristics produced through geologic time which add to its importance. The abundance of power reserves and the excellent water routeways and its transitional position have contributed to make the Niagara Peninsula one of the principal routeways and crossroads of this continent. It is therefore the geological build and structure, along with glacial and climatic factors which has permitted the high degree of human development in this area. By an examination of the geological evolution, we shall be able to see how the present scenery came about.

THE PALEOZOIC ERA

It was during this long period of time, when the area was generally under the sea, that deposits of sand and silt from the Canadian Shield and later from the tops of the rising Appalachian mountains were laid down in this area. The variety of sediments deposited account partly for the present topography.

The Niagara Peninsula area in Paleozoic times, alternately land and sea, received widespread deposits, the nature of which depended on the depth of the sea water and the proximity to the shore. Gradually the sea floor sank under the increasing load of material, and the older sediments came

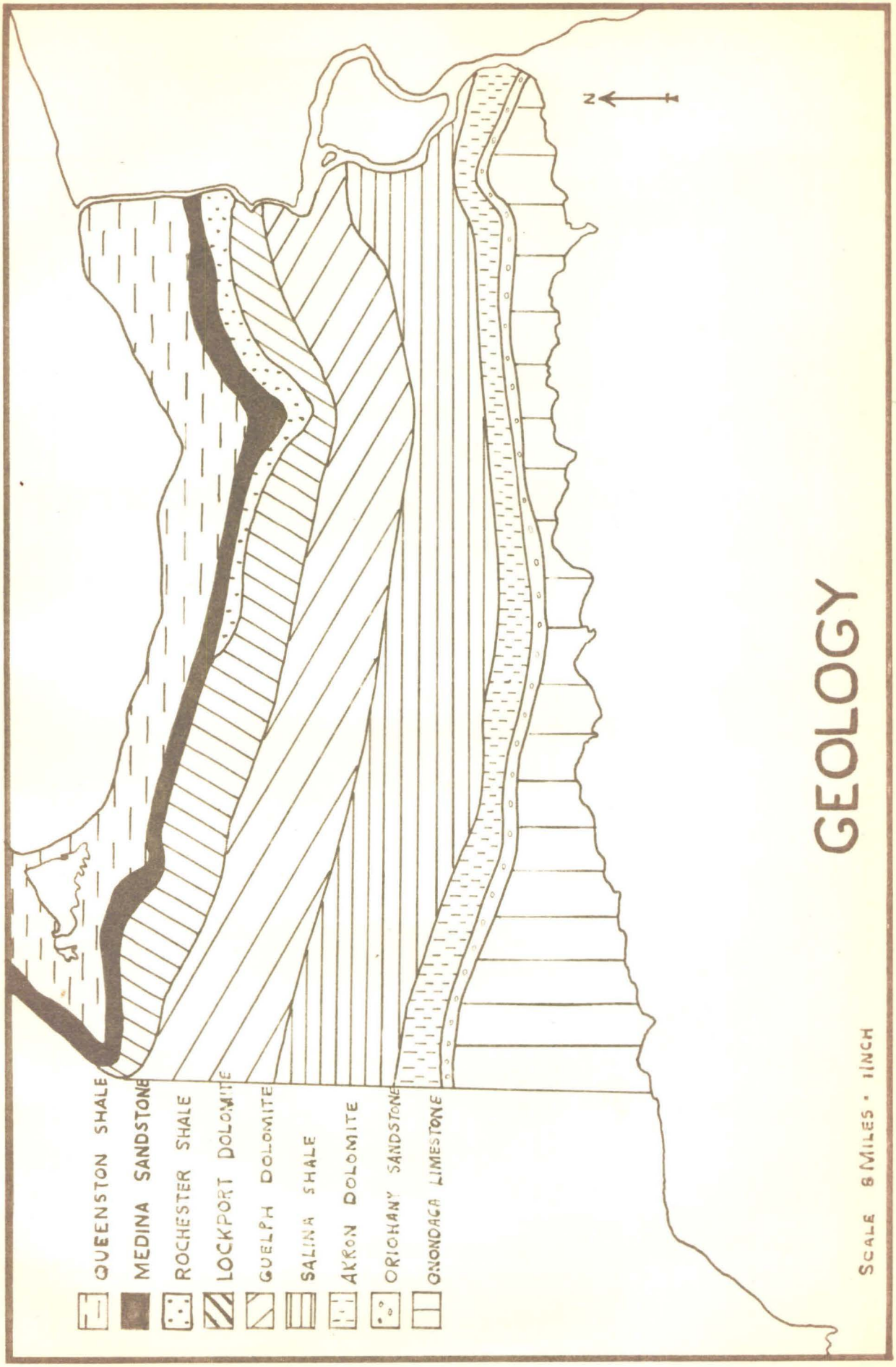

GEOLOGY
QUEENSTON SHALE
MEDINA SANDSTONE
ROCHESTER SHALE
LOCKPORT DOLOMITE
GUELPH DOLOMITE
SALINA SHALE
AKRON DOLOMITE
ORISKANY SANDSTONE
ONONDAGA LIMESTONE
SCALE 8 MILES - 1INCH
N

FIG. 3

to be buried by younger ones. With this generalized picture, we shall now look at the different geological periods beginning with the oldest one.

The Ordovician Period is characterized by Queenston shale. They are soft and easily eroded. This fact has allowed the retreat of the northern escarpment permitting the formation of a rich shale plain. During the glacial periods, much of the shale was picked up by the glaciers and carried up onto the escarpment top where it was deposited in the forms of moraines and till plains. Since the shales are easily eroded, they appear relatively soft to the subsequent streams of pre and post-glacial drainage with the result they have become deeply ravined wherever they occur.

The Silurian Period is made up of several formations. The Medina sandstone formation constitutes the terrace or bench formation at the base of the Niagara Scarp. They have resisted erosion thereby helping to prevent further cutting of the scarp face. The next main bed is the Clinton formation. These dolomitic rocks are also resistant to erosion. But overlying the Clinton dolomites are the very soft Rochester shales. They are easily eroded away and therefore do not contribute to the slow retreat of the Niagara Falls. The narrow band of Rochester shales fades out rapidly as it stretches westward in the Niagara Peninsula. Above the shales are found the very resistant Lockport dolomites. It is perhaps the greatest factor in the slow retreat of Niagara Falls. Its resistance to erosion has

helped also to prolong the life of the escarpment. In the Salina formation are found valuable commercial deposits of gypsum and salt. The softer Salina shales lying between the Akron and Guelph dolomite formations, is marked by differential erosion. It has been eroded and weathered away by the Chippawa and Tonawanda Creeks to form the Welland-Tonawanda vale. The mediocre drainage in this vale accounts for one of the greatest swamp areas in the Peninsula. The Akron dolomites have proved resistant to erosion and have produced a small scarp topography parallel to the Lake Erie shoreline known as the Onondaga Scarp. This scarp has been but a minor barrier to human movement and progress in contrast to the Niagara scarp.

The two formations of the Devonian Period are the Oriskany sandstones and the Onondaga limestones. The Onondaga limestones are more extensive than the Oriskany sandstones. Both form part of the relatively flat, ill-drained dip-slope of the Onondaga escarpment.

The Paleozoic Era was the time of marine transgressions and deposition. The strata formed were originally horizontal. A later era caused noticeable tilling in this region due to pressure changes within the earth. Unequal erosion has resulted in a limestone ridge of the Niagara escarpment, bounded by two shale plains. A small hard limestone scarp, the Onondaga, divides the Niagara dip slope plain into a broad depression in front of the Onondaga escarpment and a gentle dip slope Erie plain. The dip of the rocks is to the south. As one could expect, therefore, the escarpment faces north, running from east to west. The inclination of the rocks

and the varying resistant layers of the rocks, have given a resistant steep upper slope and a more gently inclined lower slope to the escarpment faces. It must be remembered that the Onondaga escarpment is less conspicuous and continuous, yet it does have certain geographic controls such as on drainage, land use, and settlement.

The influence of structure on relief is very important as it is partly responsible for the differences in climate, vegetation, agriculture, communications, industry, and settlement of the entire area.

The Pleistocene Epoch

While the build of the Niagara Peninsula is closely related to its bedrock structure, its surface features are caused largely by glaciation of the Pleistocene Epoch.

In the Niagara Peninsula the work of the ice was to modify the earlier topography both by erosion and deposition. The active erosion of the advancing glaciers has been covered up very largely by the deposition of the retreating glaciers. But many effects of the erosive force of the ice sheet can still be seen in the stripping of soil from the surface leaving small areas of exposed rock along the face of the escarpment and on the scarp brow itself; steepening of the scarp face; and widening and lengthening of the re-entrants such as St. David's Gorge.

The forward movement of the glacier produced a surface of till moraine. As the glacier moved across the plain at the western side of the Peninsula, boulder clay oval

hills called drumlins were deposited. Then as the glacier was receding, as a result of greater melting than accumulation, cold periods occurred. In these periods the ice lobes re-advanced, overriding the recently deposited drift and building a moraine at the terminus of each advance. The meltwaters of the retreating ice lobes raised the water level of the glacial lakes. Glacial Lake Warren covered the southern half of the Peninsula. It is during this stage of glacial history, that many fine sand, silt, and clay deposits occurred. The lake deposits tend to obscure the previous deposits of glacial drift. Only the deeper deposits of the advancing ice-sheet like drumlins and terminal moraines stand out in the southern and central parts of the Peninsula. For this reason ground moraines are not very abundant being subsequently buried by glacial lake deposits. Depositional activity has played a more important role in the Peninsula's history than erosional effects.

The following section is a more detailed description of the superficial features:

Vinemount Moraine

This was the last moraine to be formed and therefore less eroded than the other moraines or modified by time. The Vinemount moraine consists of a series of ridges running along the brow of the Niagara escarpment. It is not a continuous moraine as it has been divided by the streams that have eaten into it from re-entrants along the cuesta. This moraine has played an important part not only in the drainage from the

scarp top, but also in agriculture. The Vinemount moraine in the region of Chedoke and Mount Albion are sites of some of the best dairy farms. This morainic system stands out not only as a distinctive landform, but as a distinctive land-use type.

Elfrida- Niagara Falls Moraine

This moraine is similar to the Vinemount moraine. Number twenty highway runs along the moraine's extent. Throughout its entire length, the Elfrida-Niagara Falls moraine is associated with dairying. The surrounding types of land have different land uses and are not as good as that of the moraine.

Mount Hope Moraine

The moraine is fairly rugged in the western section of the Niagara Peninsula but dies out under the lacustrine clay plains in its eastern extension. The Mount Hope moraine is cut into numerous spurs and outliers because of the surrounding lacustrine deposits. In the region of Mount Hope village it widens out and becomes more even. Here it is most fully developed. The moraine reappears near Welland but here the land use is characteristic of lacustrine soils and is therefore excluded from this section.

Kame Moraine

The kames in the Niagara Peninsula do not form a series of parallel ridges. This indicates that the ice did not retreat evenly across the region. Rather the kame areas are isolated at Ancaster and Fonthill. Both kamey areas are located at the largest re-entrants into the escarpment,

namely the Dundas Valley and the Power Glen. The kamic relief is fairly rugged and presents farming difficulties to-day. Both the Ancaster and the Fonthill kame moraine stand out as distinct land use types.

Drumlin Fields

These developed far beyond the escarpment brow. Most of the drumlins are found in the Caledonian districts. The drumlin field has created many settlement problems with its poorly drained swampy inter drumlin regions and steep slopes. Throughout this area there has developed an association of drumlins protruding through the lacustrine deposits.

Glacial Lake Deposits

The formation of a lake over much of the Niagara Peninsula resulted in deposition and some erosion. The two lakes which affected our region were known as Lake Ontario, then Lake Iroquois, and Lake Erie then Lake Warren. Lake Iroquois stood at a high level long enough to form remarkable bars and spits. The sands and gravels and varved clays of this former lake have been of direct value in the development of different parts of the region. The areas covered by the waters of Lake Iroquois have provided for fruit growing farms, easy road and railway communications, and sites for settlements.

Lake Warren stretched inland over the moraines laid down by the glaciers. The retreat of Lake Warren took place irregularly. Therefore the working and reworking of material in this portion of the Niagara Peninsula has left some

insignificant beaches which are very discontinuous and irregular. From the viewpoint of human settlement, the Warren lacustrine flats are the most important deposits.

DRAINAGE SYSTEM OF THE NIAGARA PENINSULA

The drainage system is made up of several important rivers and numerous smaller ones. The rivers in the northern part of the Peninsula flow into Lake Ontario. The rivers in the southern part flow into Lake Erie. The central part of the Peninsula is drained eastwards to the Niagara River. The two main drainage areas, Lakes Ontario and Erie, are joined by the Niagara River.

Structure and glaciation have played very important roles in the development of rivers in the Peninsula. Many of the streams flow in a west-east line as they follow the main structural lines. However, glaciation has contributed in some cases to this west-east trend by such controls as terminal moraines. Glaciation has also altered the pre-glacial picture drastically in some cases. The Niagara River, for example, flows across the grain of all the formations and against the dip of all the beds. The river started to flow after the retreat of the ice-sheet from the basin of Lake Ontario. This important change caused by glaciation in this region shifted the drainage axis from the head of Lake Ontario to the head of Lake Erie; the Niagara River replaced the Dundas waterway.

The Niagara Peninsula's drainage system will be discussed briefly under the following headings:

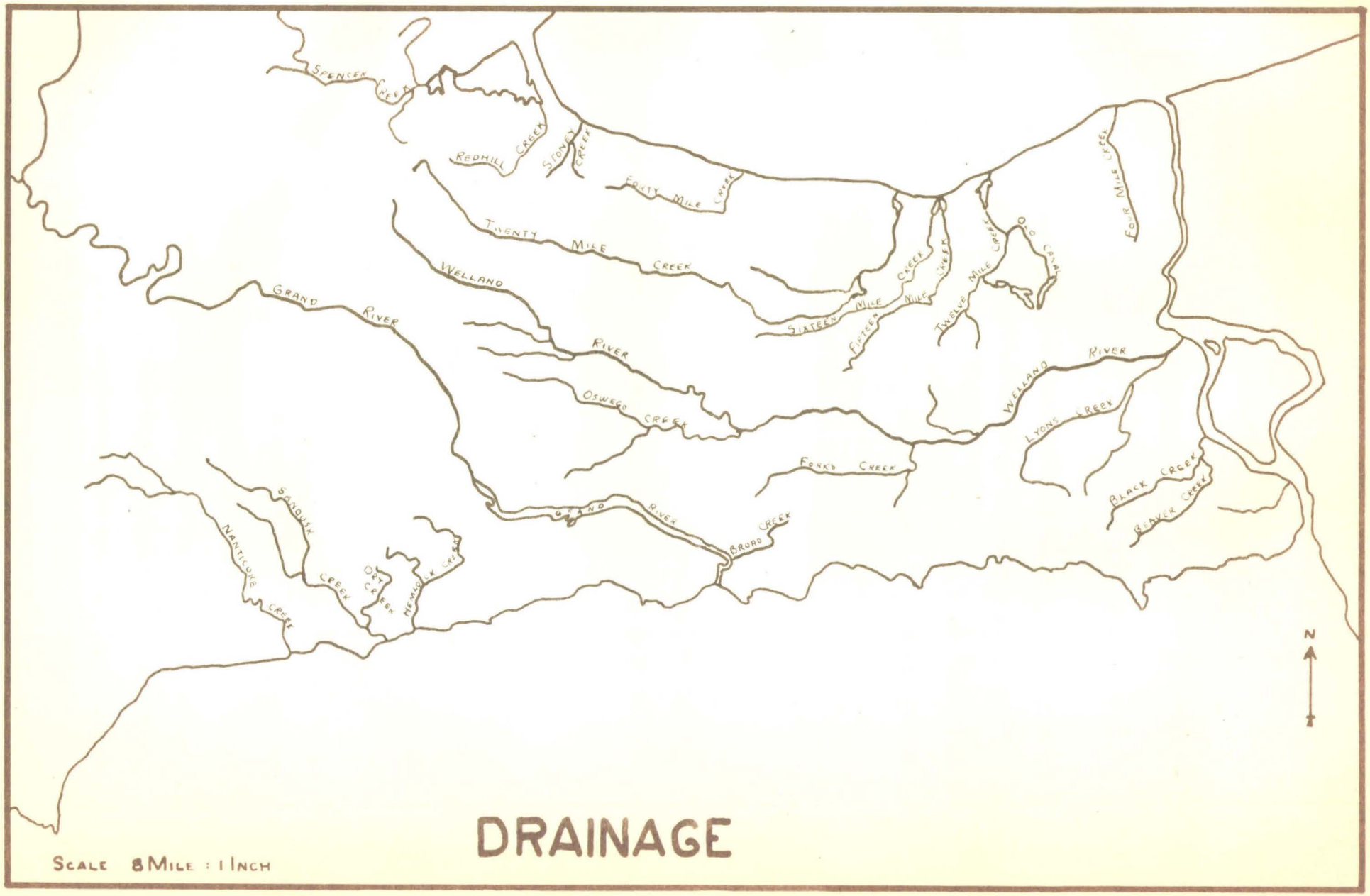

SPENCER CREEK
REDHILL CREEK
STONEY CREEK
FORTY MILE CREEK
TWENTY MILE CREEK
WELLAND RIVER
GRAND RIVER
SIXTEEN MILE CREEK
FIFTEEN MILE CREEK
TWELVE MILE CREEK
OLD CANAL
FOUR MILE CREEK
WELLAND RIVER
OSWEGO CREEK
FORKS CREEK
LYONS CREEK
BLACK CREEK
BEAVER CREEK
GRAND RIVER
BROAD CREEK
SANDUSK CREEK
NANTICOKE CREEK
OTTY CREEK
MEHARRY CREEK
N
DRAINAGE
SCALE 8 MILE : 1 INCH

FIG. 4

1. LAKE ONTARIO DRAINAGE.

The system consists of rivers and streams that, originate for the most part on the escarpment top. These streams find their way down the escarpment side, across the Iroquois plain to the lake. Most of the streams originate in the glacial moraines at the escarpment's edge. Some of the streams along the scarp face are Four Mile Creek, Twelve Mile Creek, Twenty Mile Creek, Stoney Creek, and Red Hill Creek. The streams named by numbers indicate the distance of those creeks from the Niagara River.

The pre-glacial Dundas valley, now largely filled with glacial deposits, has several small streams which have dissected the deep drift deposits. Such streams as the Spenser Creek coming from moraines up the valley eventually reach the lake by the Dundas Valley. The kame moraines act as a watershed for the streams flowing into Lake Ontario and the tributaries of the Grand River such as Fairchild and Big Creek.

2. LAKE ERIE DRAINAGE.

As far as the Niagara Peninsula is concerned, the system here is relatively insignificant except for the Grand River. It is mainly post-glacial in origin. The rivers and streams owe their course of direction to the slope of the Onondaga escarpment. To the east of the Grand River, the gradient is so slight that southward drainage can almost be disregarded. To the west of the Grand River, the streams have a slightly steeper gradient, consequently the creeks have

developed shallow valleys through the clay plains cutting down to the bedrock below.

The Grand River, next to the Niagara River, is the most significant river in the peninsula. The river has shown the effects of rejuvenation by the marked river terraces and stranded bluffs. The Grand River has a very small gradient for the last twenty-seven miles of its course; exactly one foot to one mile. So very little valley cutting has occurred in this portion of its course. The areas drainage by the Grand River and its tributaries outside the Niagara Peninsula gives the river much greater importance than the area through which it passes inside the Niagara Peninsula.

3. NIAGARA VALLEY DRAINAGE

The principal river here is the short Niagara River which joins Lake Erie and Lake Ontario. There is a waterlevel drop of 326 feet between the two lakes. Approximately half of this drop occurs at Niagara Falls. The Niagara Gorge, of varying width, has been produced by the retreat of the waterfalls.

The chief tributary of the Niagara River is the Welland River. It is the major river of the dip slope plain of the Niagara cuesta. It originates from the sandy moraine near Ancaster, and takes a meandering course across the clay plain to the Niagara River. The gradient is steeper near the river's source, and becomes more horizontal on the plain area.

PHYSIOGRAPHIC REGIONS

The distribution pattern of physiographic regions in the Niagara Peninsula is not as complex as other areas in Southern Ontario. In fact, it lends itself to a division on a broad scale. The physiographic contrast is accentuated by variations in land use, between specialized and generalized farming practices.

The three main physiographic regions are: the Niagara escarpment, the scarp-foot plain, and the dip-slope plain. This last division can be further subdivided into several subregions.

NIAGARA ESCARPMENT

This relief feature is very pronounced and displays a terrain not found elsewhere, even in comparison with the Onondaga escarpment. The vertical cliffs along the brow mark the edge of the Silurian dolomite formation while the slopes are carved in shale. The escarpment in the Niagara Peninsula does not have as much relief as in other sections of its extent. But it still hinders the transverse movement while aiding the longitudinal movement in the Peninsula. The top of the cuesta is mantled by the morainic deposits while at the foot of the escarpment is the narrow Iroquois plain of lacustrine and morainic material stretching from east to west.

There are two chief breaks in the escarpment: the Niagara River and the Dundas Valley. Between these two gaps are found some very important re-entrants of river valleys which have

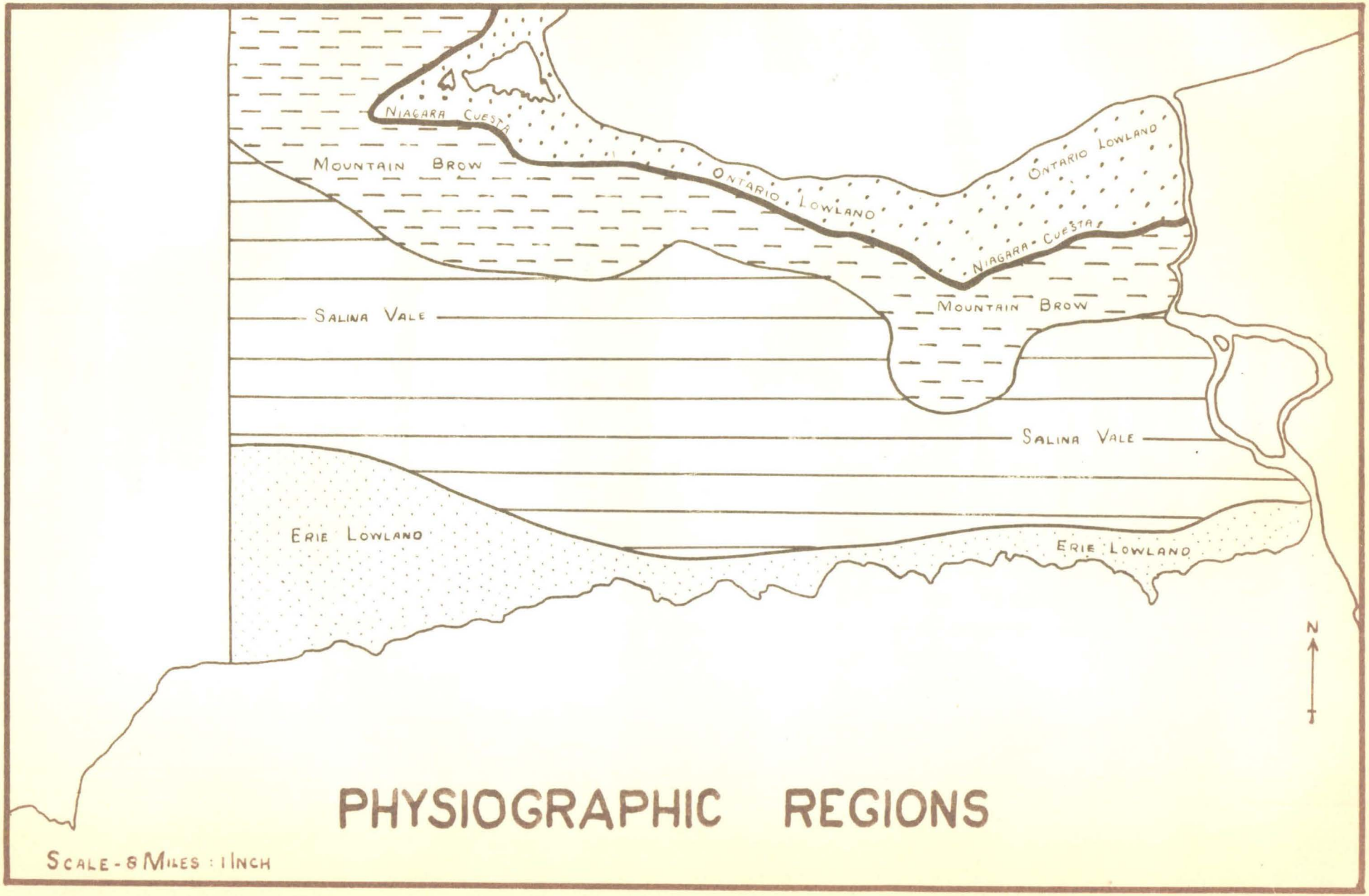

NIAGARA CUESTA
MOUNTAIN BROW
ONTARIO LOWLAND
ONTARIO LOWLAND
NIAGARA CUESTA
MOUNTAIN BROW
SALINA VALE
SALINA VALE
ERIE LOWLAND
ERIE LOWLAND
N
PHYSIOGRAPHIC REGIONS
SCALE - 8 MILES : 1 INCH

FIG. 6

been of great value in the modern transportation development of the Peninsula.

The lowland bordering Lake Ontario was inundated in late Pleistocene times by a body of water known as Lake Iroquois. Its old shorelines, including bars, cliffs and beaches are easily identified while the undulating till plain above stands in contrast to the former wave action or Lacustrine deposit.

SCARP-FOOT PLAIN

The Iroquois plain can: be divided into the upper and lower terraces. There is a great contrast between these two terraces in land use. It is the physical differences, such as soil and drainage which explains its influence on agriculture.

The lower level terrace can be summarized very briefly. It is a low, flat, and poorly drained sandy terrace along the edge of the lake. As drainage improves inland, agricultural development has become so important and outstanding, that it has become one of the greatest fruit farming areas of Ontario. In the past and the present, it is not very attractive for settlement, so that most of its inhabitants are specialized farmers.

The upper level terrace has better physical location, being better drained with gravelly soils. This is reflected in the greater diversification of specialized agricultural activities. Competition is keen here, as the terrace is

irregular in width along the edge of the escarpment and therefore creates a lack of space in many areas.

DIP-SLOPE PLAIN

This is an extensive area situated between the Niagara escarpment and Lake Erie. It is much larger and more varied than the scarp-foot plain, and is not nearly as significant as far as specialized agriculture is concerned. The region has been subdivided into subregions according to such deposits.

(a) THE SCARP BROW

This subdivision is characterized by three moraines crossing the escarpment top in an east-west direction. Water action of glacial lakes have levelled and modified the moraines making them less conspicuous. The moraines have formed the best dairying zone in the peninsula. The kame moraines of Dundas and Ancaster present more rugged relief, and therefore makes for certain farming difficulties, especially in earlier times. The edges of the kames have been levelled and smoothed by glacial waters. Here good farms are found specializing in certain agricultural products like vegetables, dairy cattle, and some orchards. Internal drainage is generally imperfect throughout the area where level stretches occur, while external drainage improves on the sloping ridges. Gradually the moraines fade out as the heavy wet clays expand eastward and southward.

(b) SALINA VALE

This is a gentle clay depression lying between the moraines to the north and the Onondaga escarpment to the south. The flat clay plain is of lacustrine deposition from the former

Lake Warren. Streams meander in wide and gentle valleys through the plain. Drainage is the main problem especially in the east where large areas of poorly drained sands, silts, and clays are found. The clay plains of low relief have been developed for general farming. Zones of specialization are gradually emerging in certain sections of the region where drainage has been improved. But this region does present a problem with its heavy clay soils which is deficient in lime, phosphorus, and organic matter.

(c) ONONDAGA CUESTA

The small Onondaga cuesta separates the Erie Lowlands from the Salina Vale. The Onondaga dip-slope has much lighter and better drained soils than the clay plains. Such conditions are shown in the distinctive land use change from general farming to dairy and cash crop farming. The escarpment has therefore played an important part in the agriculture of the Niagara Peninsula.

(d) ERIE LOWLANDS

South of the Onondaga escarpment is the Erie Lowland region. In the western section is one of the most uniform areas in the Niagara Peninsula as there is an almost unbroken expanse of Haldimand clay soil. The eastern section of the Erie Lowlands is characterized by a number of small, low beaches, stranded above the present beach. These beach ridges form little patches of better drained and more fertile farming land than the clay flats which surrounds it. The land, therefore, is better for dairying.

SHORELINES OF THE NIAGARA PENINSULA

The two lake shores which bound the region on the north and on the south are of very different character. Each has contributed positively or negatively to the settlement of this region.

The Lake Ontario shoreline is one of mature submergence and stands out as a relatively straight coastline. The geological processes has been one of eating away of headlands and filling up of bays. This has caused the indentations to be obscured by the development of bay bars across the mouths of the drowned river valleys. The shore profile for most of its length consists mainly of abrupt cliffs cut back by erosive wave action. This process has left very few sites for harbour development along the entire Lake Ontario coastline. Either the shore is too straight and backed by cliffs or else the problem of silting enters the picture to prevent the construction of harbours. Only the openings at the Twelve Mile Creek bar and the Burlington bar have permitted harbours to be established at Port Dalhousie and Hamilton. The Lake Ontario shoreline is characterized by lagoons, abrupt cliffs, and easily eroded Queenston shale.

The Lake Erie shoreline is one of youthful emergence. The shoreline is characterized by limestone and morainic headlands that have resisted erosion and embayments that reach far inland. This is partly due to the harder limestone rocks found along the coastline and the dip of the rock structure. Lake Erie is much shallower than Lake Ontario and has an extremely shallow submarine platform. This feature also helps

to give Lake Erie a much more diversified shoreline than Lake Ontario. The relatively flat, gently sloping land along the shoreline has allowed it to be settled by small coastal ports like Port Colbourne, Port Maitland, and Port Dover. The rivers flowing into Lake Erie are attempting to deepen and widen their valley bottoms rather than to fill the bays up with silt deposits as along the Ontario shoreline. The sandy beaches and sand dunes found east of Port Maitland have made this area a popular holiday settlement.

C L I M A T E

The Niagara Peninsula lies within the cyclonic belt of North America and therefore possesses a very changeable climate. It is in a cool temperate, semi-humid climatic area with sufficient precipitation throughout the whole year. The Niagara Peninsula, in common with the remainder of Southern Ontario does not have prolonged extreme conditions, such as long periods of severely cold or of excessively warm weather. We shall now turn to the most outstanding controls of the climate of the Niagara Peninsula.

The first main influence is that of latitude. The entire Niagara Peninsula lies within an area which is directly in the path of the westerly winds and the cyclonic storms which cross the continent from west to east. Despite its position the peninsula is not subjected to the continental extremes. The majority of the eastward swinging weather fronts come under the ameliorating influences of the adjacent Great Lakes. This

accounts for the distinctly higher average temperatures of the Niagara Peninsula in comparison with the rest of Lake Ontario. This milder climate has allowed the flourishing of subtropical vegetation.

The influence of structure on climate can be studied on a widespread or very localized basis. The wider implications are governed by the intermediate position between the Great Lakes and St. Lawrence depression along which the chief air masses travel in summer and winter. This wider outlook as to the influence of structure determines the main characteristics of the climate; but the localized structure accounts for variations in the overall climatic picture of the area. The Niagara Cuesta is the best example, as it protects the scarp-foot plain from the extreme forces of the storms. The influence of structure explains therefore the mild winters in the Iroquois plain area.

The local relief itself has even more special effects. Here the greatest influence is the contrast between the coast-line areas and the interior sections of the Niagara Peninsula. The land-water anomalies between the coast and interior are most pronounced in the winter season. The climatic differences produced are not too significant to human beings, but are very important in agriculture. The land-water effects are more noticeable along the scarp-foot plain than the Erie lowlands as Lake Ontario is much deeper than Lake Erie which is very shallow. The protection afforded by the Niagara Cuesta to the

scarp-foot plain is also of value when considered in conjunction with the proximity to Lake Ontario. The differences in the proximity of land to water can be seen by the fact that the coastlines have 8 days longer frost free time in the spring and about eighteen days longer frost free period in the fall than the interior section. This is caused by the initial local low pressure systems established over the lakes. This longer frost free period along the Ontario shoreline is one of the reasons for the prominence of fruit orchards below the escarpment top rather than on it. The contrast of Erie versus Ontario agricultural land use can be explained by the fact that the Erie area had clay soils whereas the Ontario area has sandy soils. The effects of the two lakes are least important in the summer time, because of the higher temperatures throughout the Peninsula. As one moves southward from the escarpment brow towards the interior, temperature variations are greater. Climatic differences affecting land use do exist on a more localized scale.

The following climatic regions are distinguished by

(1) The Niagara Fruit Belt.

This is the second warmest area of Southern Ontario. It owes its advantage to its sheltered position behind the Niagara escarpment and the moderating influence of Lake Ontario. Both are more effective in the winter months than in the summer as there are very few winter killing temperatures in contrast to other parts of the province. This has probably allowed the great concentration of fruit farming in this region. The heating of the soils is ten days behind the Leamington area

and is therefore not as favourable for vegetable farming. But vegetables are grown to some extent as subsidiary crops.

(2) Erie Counties or Dip-Slope General Farming Region

This region is characterized by its greater susceptibility to extremes of cold and heat. Lake Erie is not nearly as effective in moderating the climate as Lake Ontario. Between the escarpment brow and the shore of Lake Erie there is only a gradual change in climate, no sudden abrupt change as at the Niagara escarpment. The south-north differences in climate are greater than the east-west which are slight and not very important.

These are the two main regions. Other regions can be found on a micro climatic basis but they are not very important for the purpose of this study. There still remain several important factors to be discussed under climate which has had some influence upon land use and settlement.

There occurs at times unseasonal droughts, late spring thaws, early autumn frosts, etc. Droughts are a major problem in many years, particularly in the protected scarp-foot plain which may lose as much as 50% of its normal precipitation. The Salina vale is not as susceptible to droughts, though much of its summer precipitation is in the form of thunderstorms.

Minimum and maximum precipitation is closely correlated with physiography. Both in abnormally dry or wet years, the Niagara cuesta receives more rainfall than the rest of the Peninsula because of its relief feature. The

scarp foot plain is just the exact opposite. In abnormally dry years, this region is hardest hit and in abnormally wet years there is no significant change in precipitation amount from the average figure. The Salina Vale and Erie lowlands lie somewhere between these two extremes.

The climate of the Niagara Peninsula, in summary, is that of that humid continental region of North America where the conflict between the tropical and polar airmasses is most extreme. Climatic differentiation emerges from the peninsula's general situation, its structure, and present topography. Of greatest significance is the Niagara cuesta and the scarp-foot plain which is in a rain-shadow zone. In short, the climatic uniformity exists when the region is examined in relation to other areas. However, when the Niagara Peninsula is studied as a region, climatic diversities are found to exist.

V E G E T A T I O N

According to the classification drawn up by Halliday, The Niagara Peninsula lies in the region designated as the Deciduous Forest Region. But the peninsula is truly one of transition as both conifers and decidous trees are found, the latter being most numerous. Several deciduous species like the tulip tree, chestnut, and silver maple reach their northern limits in this region. The local differentiation of tree associations corresponds to topography and drainage.

The characteristic associations found in the Peninsula consist of beech and sugar maple on the well-drained sites, and on the poorly drained sections are found basswood, red maple, and red, white and bur oak. Also contained in the

forests are white pine, hemlock, yellow birch, and larged-tooth aspen. In the early history of settlement, large areas were covered with swampy vegetation which for a long period hindered development.

The Niagara Peninsula has been closely settled and therefore much of the original forest cover has been cleared leaving only small scattered woodlots. Many are of second growth and of little commercial value. In the grazing areas, many young trees are destroyed by the grazing cattle. Thus there is no replacement for the larger and older trees when they are cut down by the farmers for domestic fuel. Reforestation has not been practised to any great extent, and even where attempts have been made, the results have not been too successful.

S OILS

It is the combination of vegetation along with parent material, topography, drainage, and climate that account for the differences of soils in the peninsula. For example, the accumulation of organic matter on the surface of the earth accompanied by poor drainage has produced mull-glei soils in certain depressional areas of the vale. Formerly these soils were left untouched by the invading settlers. However in last few decades, such areas are being drained and exploited by truck farmers with considerable success.

The Niagara Peninsula has been favoured by the ease in which organic matter decomposes and mixes with the mineral soil. This is a very important factor in accounting for the agricultural potentialities of the soils.

The actual condition of the soil shows a response to

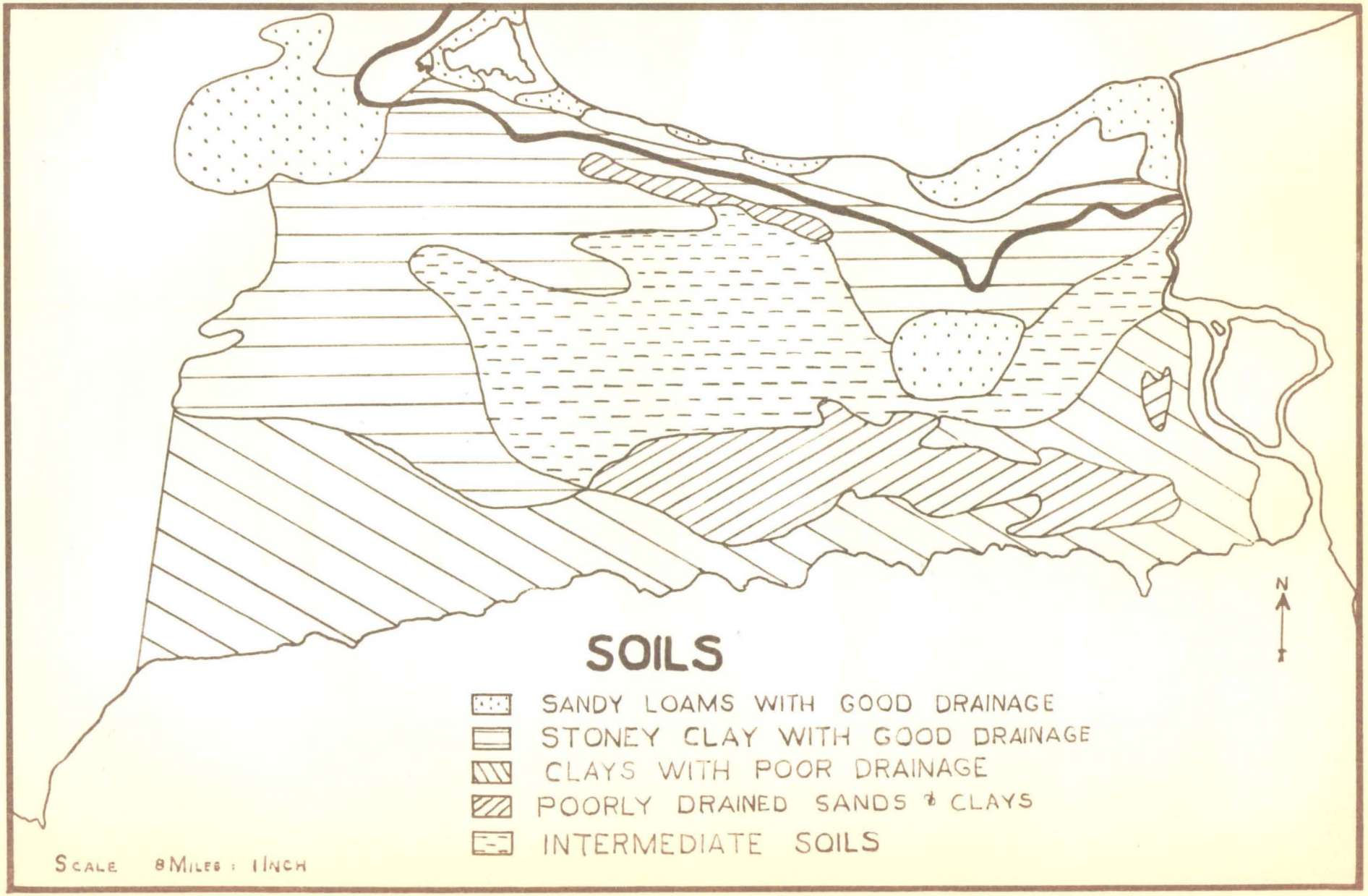

SOILS
SANDY LOAMS WITH GOOD DRAINAGE
STONEY CLAY WITH GOOD DRAINAGE
CLAYS WITH POOR DRAINAGE
POORLY DRAINED SANDS & CLAYS
INTERMEDIATE SOILS
N
SCALE 8 MILES : 1 INCH

FIG. 5

changes in relief, drainage, and vegetation; and reflects a long series of transformations made during and since the Ice Age. In general, the soils of the Niagara Peninsula are in the Grey-Brown Podzolic Zone, with some mull-glei soils in areas of poor-drainage. The climate is humid enough to create a pronounced leaching effect which is the outstanding characteristic of these soils. Some other features of the soil are the heaviness of its texture, the moderate acidity, its low lime content.

The greater part of the parent material was brought to this region by glaciation. The relief at the time was responsible for the depth to which the materials were laid down. Although the bedrock is predominantly limestone, the parent material of the soils is composed of the transported red shales. These morainic parent materials were subsequently subjected to lacustrine action at which time some deposition took place.

From the generalized soils map, it may be seen that the zonal soils dominate the north and west parts of the Peninsula; the intrazonal soils dominate the south and east parts; between the two are found the intermediate soils centralized in the middle of the Salina vale. This generalized soils picture reflects the characteristic agricultural patterns of the Peninsula.

Soils as a whole are closely related to climate, vegetation, and relief. But within the broader classifications are several different series which here reflect the glacial

Origin and the differences in parent material along with topography. Throughout the Niagara region, drainage has played a prominent role in the development of these young soils.

The soils in the Peninsula have been surveyed by Watson, Putman and Chapman, and the Soils Department of the Ontario Agricultural College. For the purpose of this study a general knowledge is sufficient to understand the agricultural picture. A broad soils grouping will reveal population patterns as imperfect soil conditions will present serious problems to agriculture.

The soils of the Niagara Peninsula shows man's adaptation of the environment, at least as far as agriculture is concerned. The sandy loams stand out as a region of small intensive farms producing fruits, truck, and canning crops. The stoney clays with good drainage are the best dairying districts. The poorly drained clays are used for larger general farms. The intrazonal soils are avoided by farmers and are still in their natural state of forest or marsh lands.

From this background picture of the natural environment we may now turn to a consideration of the changing patterns of settlement.

S E T T L E M E N T

In the history of the early settlement of the Niagara Peninsula, it will be necessary to point out only the important highlights in its human development.

Indian Settlements

The position of the Niagara Peninsula between the Canadian Shield with its cool temperatures and the Appalachian Mountains with its warm temperate forests, made the region one of transition. The Algonquins in the north pursued a hunting economy, while the Iroquois to the south were developing a mixed economy of hunting and cultivating. Between lay the Niagara Peninsula with its transitional climate and vegetation. Competition for the Niagara gateway resulted, as each group believing firmly in its culture, sought to expand into this section of North America. This conflict between two different Indian economies continued into the European periods of settlement. The agricultural potentialities of the Peninsula were more attractive to the diversified Iroquoian economy than the hunting economy of the Algonquins, and they soon swept northward into the fertile lands of Southern Ontario, pushing the Algonquins from the area. So even in early times, the wealth of the Niagara Peninsula was realized.

Generally speaking, the Indians located their villages on the banks of the many creeks and rivers in the Niagara Peninsula. The natives practised a primitive type of agriculture with maize as the chief crop supplemented by a

plentiful supply of meat from the forests. At this time, the forests were in a much more natural state, and had not been cleared to any great extent. Such a large forest cover regulated the water runoff so that there was a flow of water in all seasons. Abundant supplies of fish were also found here.

The population of the Indians occupying the Niagara Peninsula is unknown, for they did not keep any records. However, estimates made by missionaries and historians place the figure at between one and two thousand.

FRENCH PERIOD - 1670-1763.

European development in the Niagara Peninsula started in 1669 with the explorations of the Frenchman, La Salle. The French set up trading posts in the peninsula and at the same time missionaries began their work of converting the Indians to Christianity. The early French visitors travelled through the peninsula via Indian trails establishing these trading posts or missions, but contributing very little to the development of the area.

By the middle of the eighteenth century, the Niagara Peninsula once more became an area of conflict. This time it was between two white groups, the French and the English. Once again a conflict arose between two different economies. To the French, the Peninsula was a portage site through which passed the waterways which helped to knit together their extensive empire; it formed part of the chain of defenses aimed at keeping the British behind the Appalachian mountains. But to the British, the Peninsula was a gateway out of the Appalachian barrier as it formed the western end of the

Hudson-Mohawk gap; and it provided suitable sites for farming. Just as in the case of the Indians, the southern more productive and diversified economy won.

French emphasis was on trading, not settlement. The French population in the area was always small, probably never numbering more than a few hundred. The posts that were built were scattered, with the principal ones along the Niagara River.

BRITISH PERIOD

This period began in 1763. However, most of the early permanent settlers did not arrive in the Niagara Peninsula until after the American Revolution. It was at this time that all the townships of the Peninsula benefitted from the arrival of United Empire Loyalists from the United States. They cleared the forests and established permanent settlements.

One of the chief factors in the settlement of the Niagara Peninsula was its importance as a routeway for the fleeing Loyalists from New York State to Ontario. This land bridge has always exerted a strong attraction on both Canadian and American pioneers. The Peninsula was fortunate to have good well-known trails established by the Indians which facilitated penetration into the area. The condition of these trails and the few roads that did exist influenced many of the pioneers to settle down as soon as they reached available land. Since most of the trails were in the northern sections, it is to be expected that this region should be settled first. Other reasons for the early settlement of the northern lake

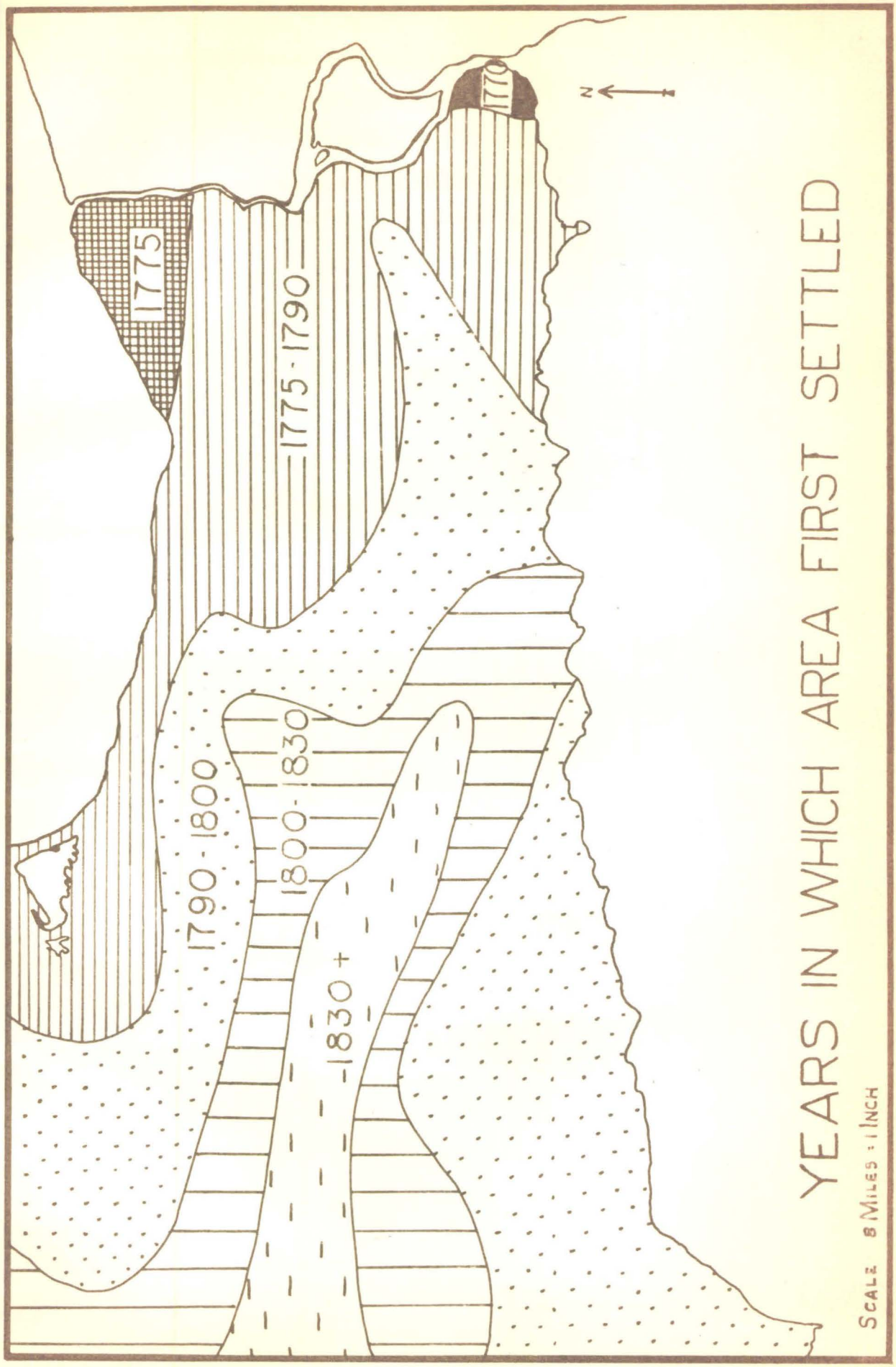

YEARS IN WHICH AREA FIRST SETTLED
1775
1775-1790
1790-1800
1800-1830
1830+
N
SCALE 8 MILES = 1 INCH

FIG. 7

shore townships were its good climate and productive soils. Settlement along the Erie shoreline was retarded largely because of inacessibility. This drawback, along with poor drainage, also affected the interior sections of the Peninsula.

By 1812, the population was spread out along the Iroquois plain and the mountain brow where road and water communication was fairly adequate for the needs of these early settlers. Trade and commerce were growing gradually due mainly to the continuous flow of traffic, the European wars, and the recent war with United States. Both these regions had been opened first by the English settlers who congregated about the grist and saw mill sites provided by the natural environment. Places away from these two areas had poor or impossible roads, and remained isolated and comparatively unsettled until after all the more desirable lands had been settled elsewhere.

THE PERIOD OF EXPANSION 1815-1861

As more people arrived in the area, settlers began to push into the interior away from the accessible and comparatively open land of the lakeshore region. The settlers followed the Welland and Grand Rivers and their tributaries first, then cleared the intervening clay depressions. Lumber played an important role in the development of the interior. The many good stands of timber were a valuable source of revenue to farmers who had little else to sell until their land was capable of producing a cash crop. It was improved

transportation which permitted the farmers to move out of a subsistence economy into a commercial one.

The canal was the medium by which the needs of the farmers and merchants were met. The canal pulled strongly against the Niagara frontier towards the heart of the Peninsula. The Niagara Peninsula began to examine its own interior, to look for its own resources, to settle and develope this area, rather than to act as a zone of communication between external regions. The result was a general shift of communication and settlement emphasis from the scarp-foot plain to the dip slope plain; a shift in leadership of the Peninsula from Niagara-on-the-Lake to Hamilton. But the most outstanding long term result was the rapid growth of Hamilton due to the use of roadways, water communication and populating of its hinterland area. For example, the Hamilton-Port Dover Plank Road (1844) gave the only impetus for the settlement of the interior as settlers preferred to follow road arteries. Since this period, Hamilton has dominated most of the Peninsula except for Toronto's great provincial influence.

Settlement by the halfway mark of the mineteenth century was no longer centralized on the Iroquois plain. Settlers filtered to the Peninsula, heading towards the interior away from the populated and high priced lands of the lakeshore plain. The interior lands, which had previously been avoided, now attracted settlers because they offered cheap lands, improved accessibility, lumber profits and soil for farming.

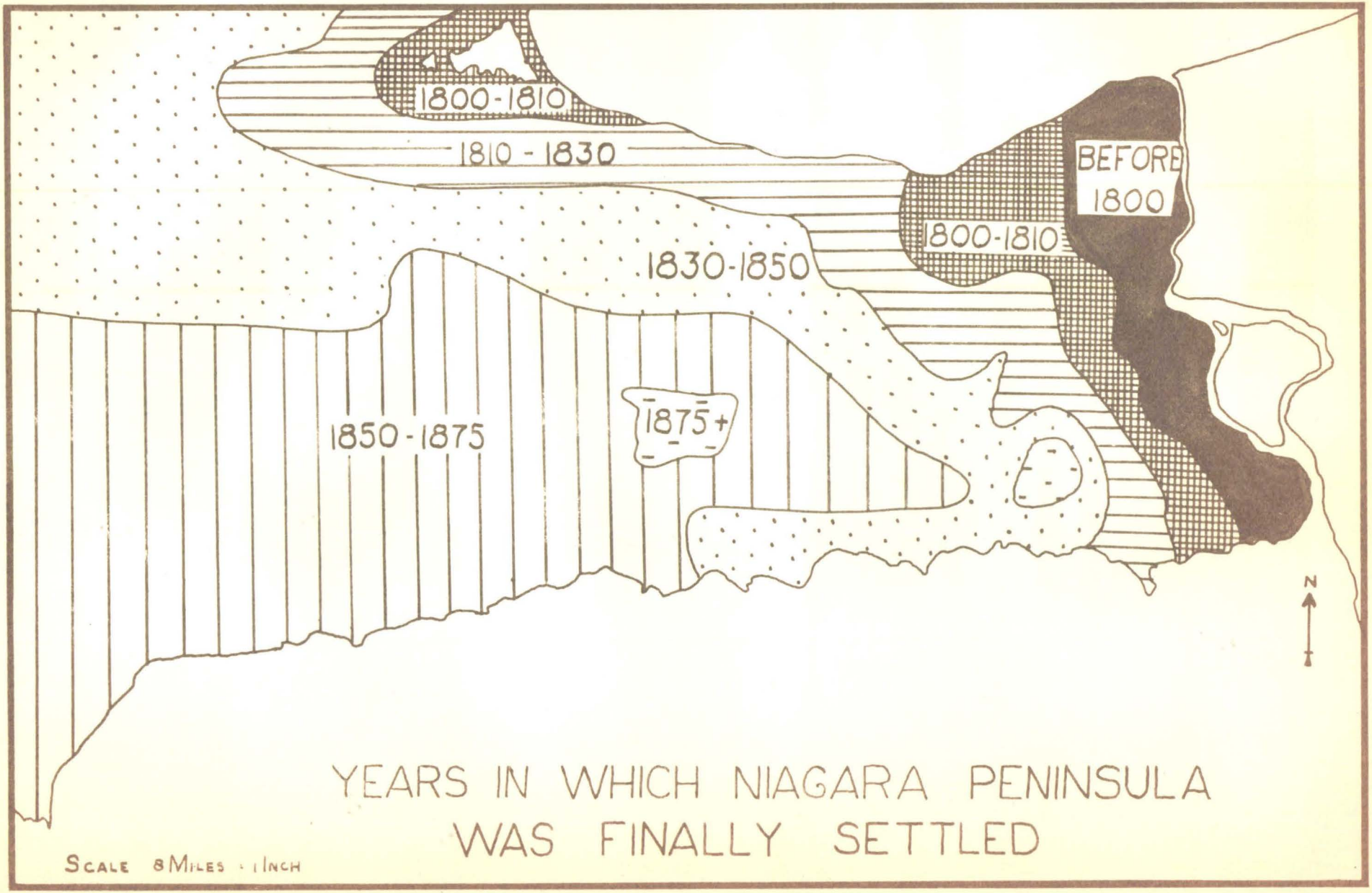

1800-1810
1810 - 1830
BEFORE 1800
1800-1810
1830-1850
1850-1875
1875+
N
YEARS IN WHICH NIAGARA PENINSULA WAS FINALLY SETTLED
SCALE 8 MILES = 1 INCH

FIG. 8

By 1861 the Niagara Peninsula had been knit together by roads and canals. Much of the interior lands formerly regarded as useless, had been filled up with farmers. From a functional viewpoint, the Niagara region was changing from a fur, lumber and homestead region to one of commerce.

STABILIZING OF RURAL POPULATION-URBAN DEVELOPMENT 1861-1901

The population in this period fluctuated in the rural areas. Some areas had reached their maximum population and started to decrease slightly. Others continued to grow in population until near the end of the century before levelling off. By the end of this period most of the land was occupied by farmers, though not all the farm land was necessarily cleared. The rural expansion was accompanied by the establishment of many inland villages that acted as servicing and processing centres.

This period saw changes not only in population movement, but also in land use. The railway had opened up the west. Immigrants now flowed westward. Their grain economy challenged that of the Peninsula. During the revolution of a gradual economic balance between the west and the east, the Peninsula lost much of its agricultural importance. There followed a depopulation of all but the most favourable areas. Because of this most of the townships had a higher rural population before 1881 than afterwards even to the present. The rural depression found relief when the Peninsula was able to adjust to a new economic system. The answer was found in the adoption of fruit and dairy farming. Since 1890 this has

permitted the rural area to maintain itself at about 85% of its former maximum population in the general farming districts.

It was not until the turn of the century that population once more forged ahead. This time it was in the urban centres that industrialization began to take hold. Before turning to the scene of the twentieth century, we will first have to study the history and geographical patterns of urban settlements. We have examined how the rural population pattern has evolved from earlier times until the turn of the century. It is only appropriate that the urban picture be looked at also.

VILLAGE SETTLEMENTS

In the earlier periods of settlement, when settlers occupied the lands around the edges of the two lakes, villages grew up at mill sites or transportation nodes. By 1800 there were several villages on the scarp-foot plain providing services for the local farmers. As rivers were more important than roads at this time for external communication nearly all the villages on the plain were located on the banks of the streams flowing to Lake Ontario. Thus we find such villages as Queenston, Saint David's, Shipman's Corners, and Grimsby beginning to develop. The best sites at this time were those which had water power as well as river transport. The escarpment brow offered location for both features and was the region of several village settlements. Some of the villages which paralled the brow were Beaver Dams, Saint Johns, Ancaster,

and Cookes Mill. Most of these Mountain brow centres have declined as other means of transportation have become more important, new sources of power have been found, Only Ancaster remains as a significant centre to-day. The cuesta formed a barrier between the progressive Lake Ontario settlements and the largely unpopulated areas of the dip slope.

Since the canal permitted the development of the interior, new villages had to spring up to serve the needs of the rural people. The Welland Canal promoted the rise of St. Catharines, Thorold, Welland and Port Colbourne. Some of the older villages were too far from these new sites and declined in importance. This was particularly true of the Niagara Valley where Chippewa, Queenston, and Niagara-on-the-lake all declined. The water routes from the Welland Canal to the Grand River opened up settlement. Small hamlets were soon developing like Cayuga and York. Meanwhile, there was an emphasis for road network throughout the Peninsula. All the roads fed on the chief waterways. These locations became sites for village development. The number of villages reflect the increasing population of the Peninsula. Some of the villages were Ridgemount, Caledonia, Ridgeville, Hagersville, Selkirk, Jarvis, Smithville, and St. Ann's. Some of these centres declined later, only to be revived by railway or highway development. The Peninsula had passed its initial pioneer stage by 1850, and village grow was trying to serve the area's more mature stage of development.

RAILWAY PERIOD

The railway era worked the greatest transformation of all in the Peninsula. The railway led to the decline of many road and canal centres, and yet at the same time it helped to stimulate other already established centres. Some of the centres to decline were Niagara-on-the-lake, Chippawa, Queenston, while some of the canal centres hard hit were Port Dalhousie, Port Robinson, and Port Maitland. But the railway age called for an international outlook with the result that bridge centres along the Niagara River were revived, like Niagara Falls, and For Erie. Likewise bridge centres in canal areas were given an impetus by railway. St. Catharines and Port Colbourne areas were thus given a means for steady growth. Railways were built for centralized cities, not for scattered villages. It is this phenomenon which accounts for the decline of the village settlements and the growth of truly urban centres.

URBAN DEVELOPMENT

This development reflects the continual change that has been taking place in the Peninsula since it was first settled by the white man. Though the Peninsula's history has been short, it has been very active. Urbanization, a phenomenon of the Old World, illustrates the progress from a pioneer economy through domestic and commercial development into our modern industrial economy. It has produced many profound changes in the Peninsula and one of the most outstanding is the concentration of people

in certain areas.

Whereas the village settlements originated to serve the needs of the rural areas, urban centres resulted from the different opportunites offered and discovered in the environment. With the urban centres, it was a case of using the rural areas rather than serving them. Yet it must be remembered that each relied on the other for continuing prosperity and advancement. The development of the canning industry between Hamilton and St. Catharines, for example, shows the influence of geographical setting and reliance of urban centres on rural settlement.

The urban picture as we know it, is the result of the railway and the industrial age. But the commercial activities and setting of the Niagara Peninsula helped greatly in preparing the region for industrial development. It was this wider commercial influence which brought the increased demand for industrial goods to the Peninsula. It was soon discovered that the local mills were unable to meet the new demands, especially when competition from large centres like Toronto and Buffalo faced them. This was one of the reasons for the decline of the many local mill sites. The disadvantage of the local power sites was further emphasised if they were located away from canals, roads, and railways, and had limited power resources. Therefore when industry first began to move into the Peninsula it began to concentrate along the Welland Canal which had excellent water, rail and road communications. But the real industrial scene of to-day

came about when railway was combined with hydro-electric power allowing industries to be concentrated at key communication junctions.

Thus in the long run, it has been the physical environment of the Peninsula which has governed the distribution of communication, industry and therefore population. But it has been the economic changes which have controlled the rate of growth of all these elements.

The influence of industry was not too great before the turn of the century in bringing people to the area and causing the shift in population from rural to urban areas. The conditions in the last few decades of the nineteenth century were just preparing for the change in the opening years of the new century. Depressions in rural areas, protective tariffs, competition from western lands, brought to the fore-front the need for change. A revival in industry and agriculture began in the 1890's, which, combined with the new tariff regulations of 1897 permitting the introduction of American enterprise on a large scale, began a new period in population increase and distribution.

So in the opening years of the twentieth Centry, industry and railway had once again shifted the asix of population and activity away from the canal to the industrial core of the Peninsula centred at Hamilton and stretching along the scarp-foot plain to St. Catharines.

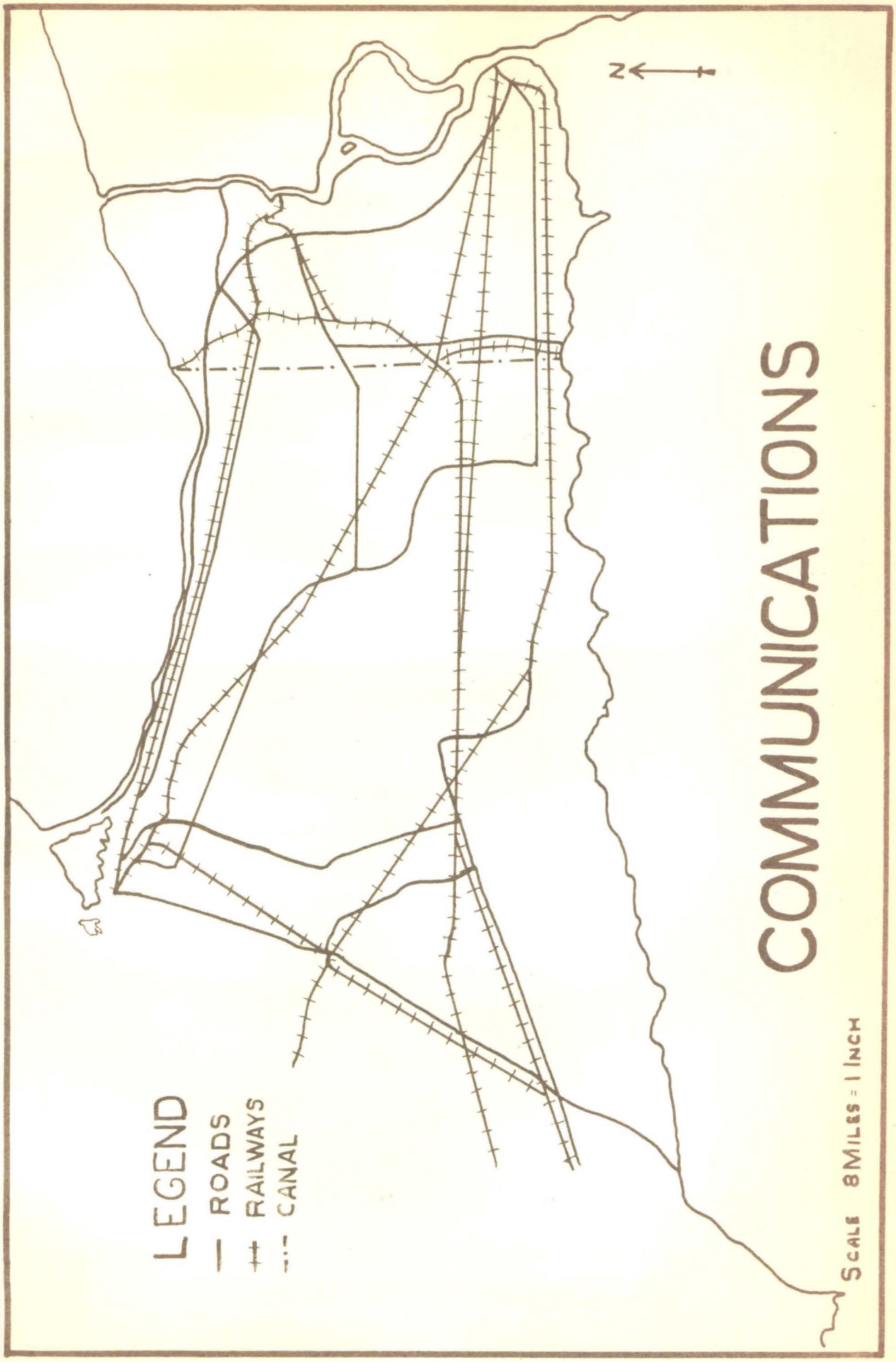

COMMUNICATIONS
LEGEND
ROADS
RAILWAYS
CANAL
SCALE 8 MILES = 1 INCH
N

FIG. 9

In summary, the three main population groups are: Those in the rural areas which reached their maximum numbers in most areas between 1861-1871, and which have now declined to maintain themselves at a lower minimum. This feature was simply a case of overpopulation in the beginning, and once agriculture had definitely replaced lumbering, permanent settlement in the rural areas became a reality, but with a decrease in population.

Then there were the rural village settlements. Some, when their services became limited and no longer required, declined and are preserved only by a handful of rural homes. Others were stimulated by railway and highways to maintain if not to grow into small prosperous towns. Their growth is due to immigration not only from abroad but from rural areas.

The major change that occurred in the nineteenth century was the growth of a few large centres of population. These large centralized cities provide services of all kinds for the Peninsula. They not only supply the wants of the rural people but create a market far greater than the villages could ever dream of producing. The wealth and prosperity of these large cities attract the rural population into the hub of its way of life. The intensity of attraction by these urban centres increased in the following decades by the advantages offered by quick and easy transportation.

RURAL POPULATION

The turn of the century saw the intensification of the late nineteenth century movement of population from rural to urban areas. In 1901, 41% of the people in the Niagara Peninsula lived in rural areas, while only 59% of the people lived in urban centres. Then in 1951, while both rural and urban areas had increased in total population, there were now 75% of the people living in urban centres and only 25% living in rural areas.

What has caused this change in the rural-urban population? In general we may state that the rural population has had to accommodate themselves to changing internal and external forces.

Previously, the Niagara Peninsula was a rural economy, but with the coming of industrialization, the Peninsula has declined in agricultural importance. Yet agriculture forms the bulwark of any existing economy and therefore is still an important part of the growing significance of the Niagara Peninsula. Agriculture and industry have gone hand in hand in the changing patterns not only of the economy but also of the population densities and distribution in the Peninsula.

Some of the changing aspects of the rural scene as influenced by industrialization; probably the most significant feature of which is the mechanization to an unprecedented degree of the farms in the Peninsula. This has freed hundreds of rural people from the land for migration to the industrial centres. Another important change created primarily by industrialization is the vastly improved transportation and

communication facilities. This has tended to urbanize even the smaller proportions of the population which have remained in farming districts. The improved roads and railway lines, providing better services to the out-of-town areas, have aided in the growth of rural non-agriculture population. This accounts for the movement of people from city to country which began in the 1920's. This explains why, although the farm population has declined, the rural population has increased steadily from the turn of the century. This is why today only 38% of the rural population are engaged in farming and 62% are engaged in some urban occupation.

Therefore the rural population may be divided into two main groups. There are the people who work in the cities and commute back and forth, and are creating very important social and cultural changes within the Peninsula. Then there are the farming people who have remained with the land through the changing patterns of land use. There has been a gradual change from a weak control of geography over the mixed farms, toward the present day specialized farms, such as fruit raising, vegetable growing, and dairying farming, in which geography has forced adjustment to the environment.

RURAL POPULATION DENSITY AND DISTRIBUTION

The highest rural density townships to-day are:

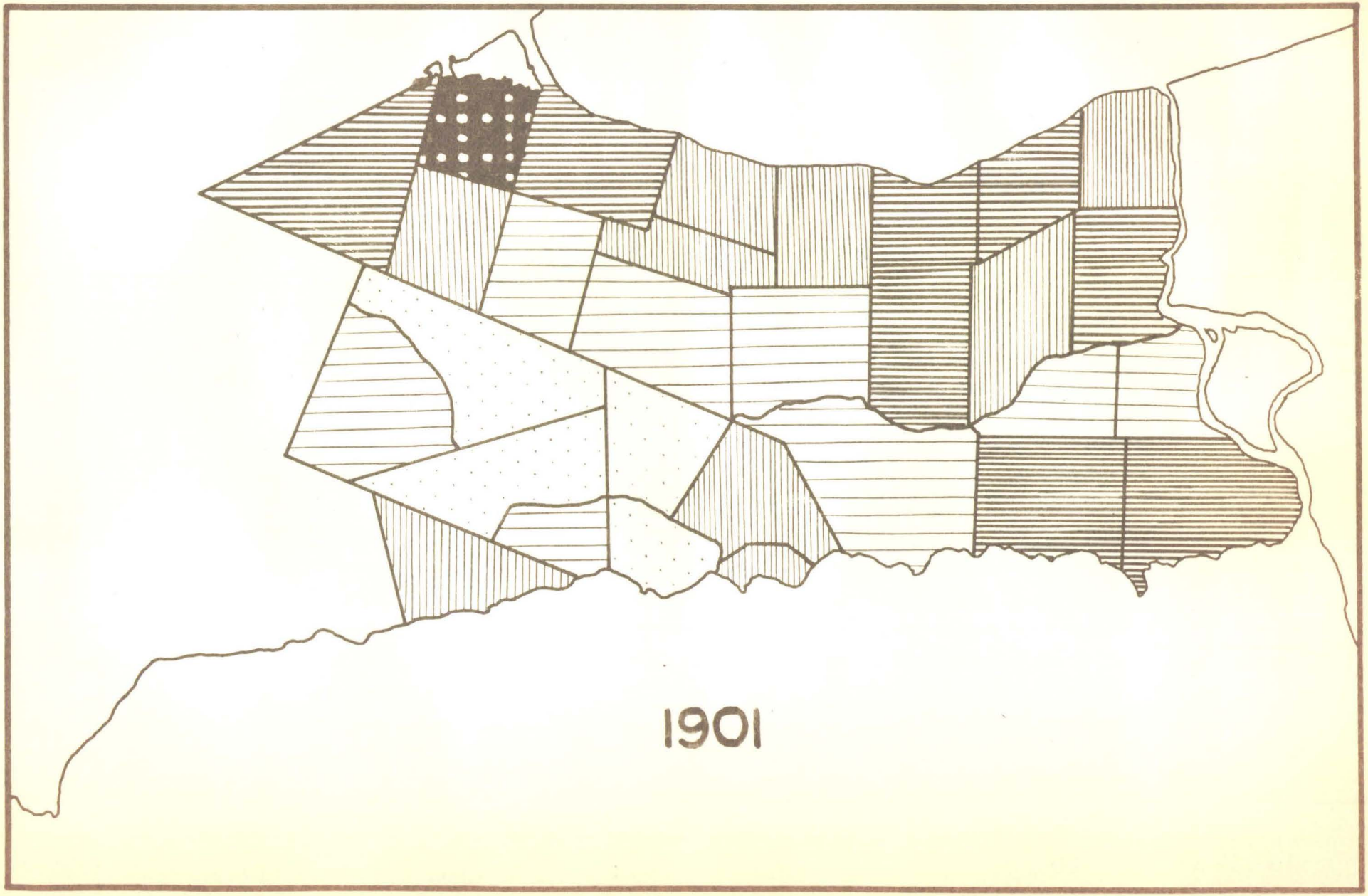
Stamford Township	492	people per square mile
Grantham "	458	
Crowland "	398	
Barton "	382	

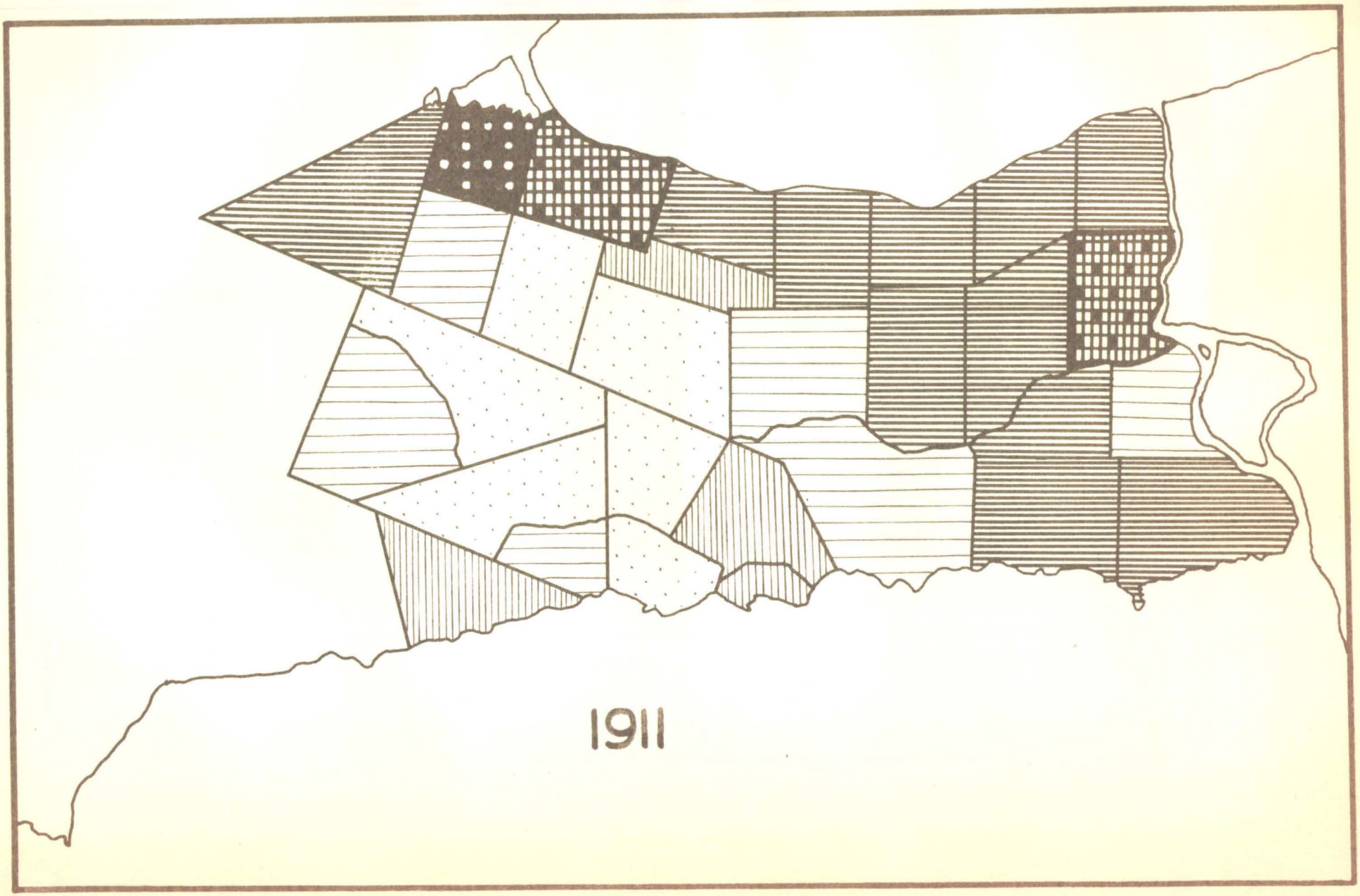
SERIES of POPULATION DENSITIES 1901-1951

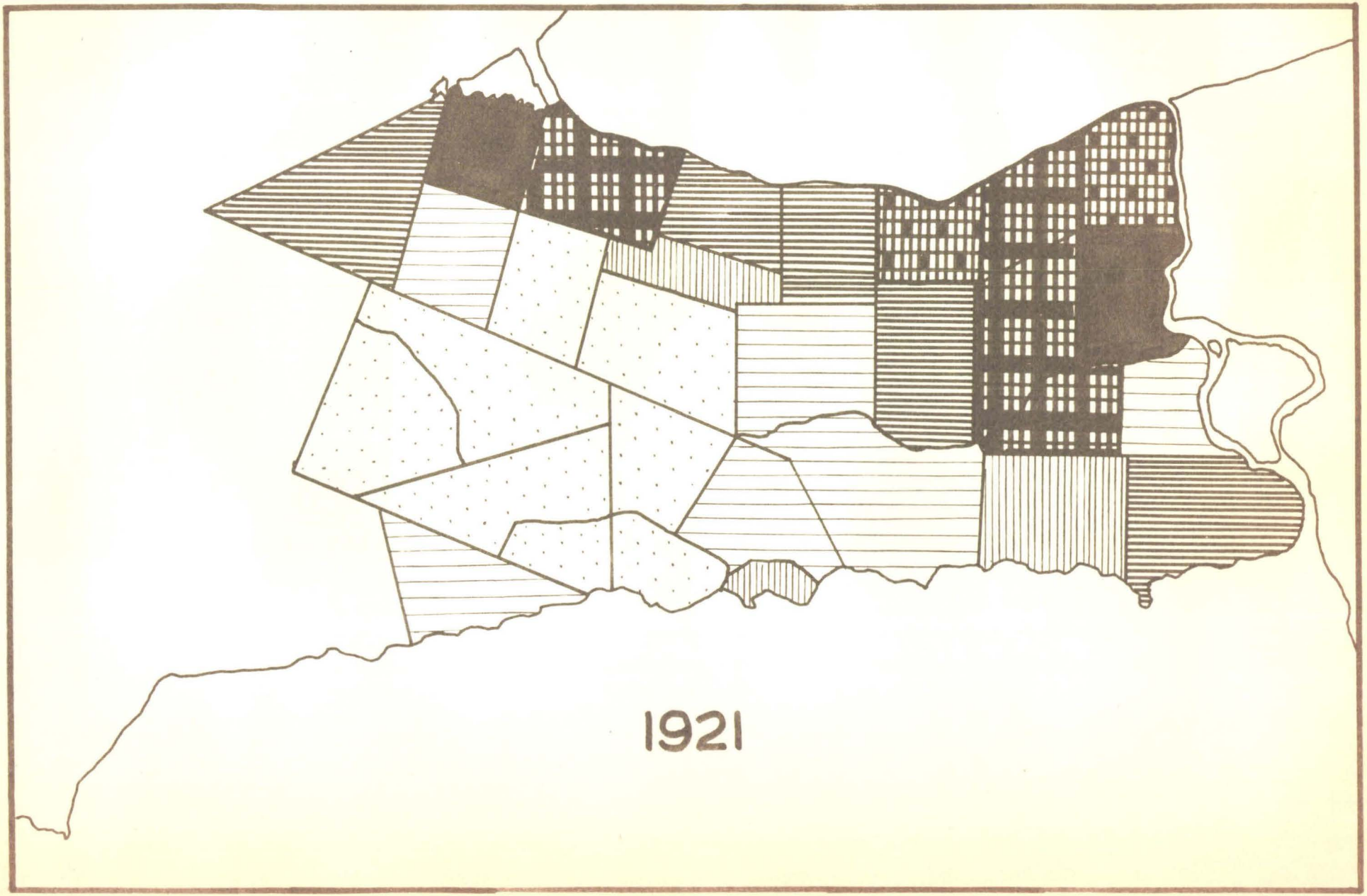
LEGEND

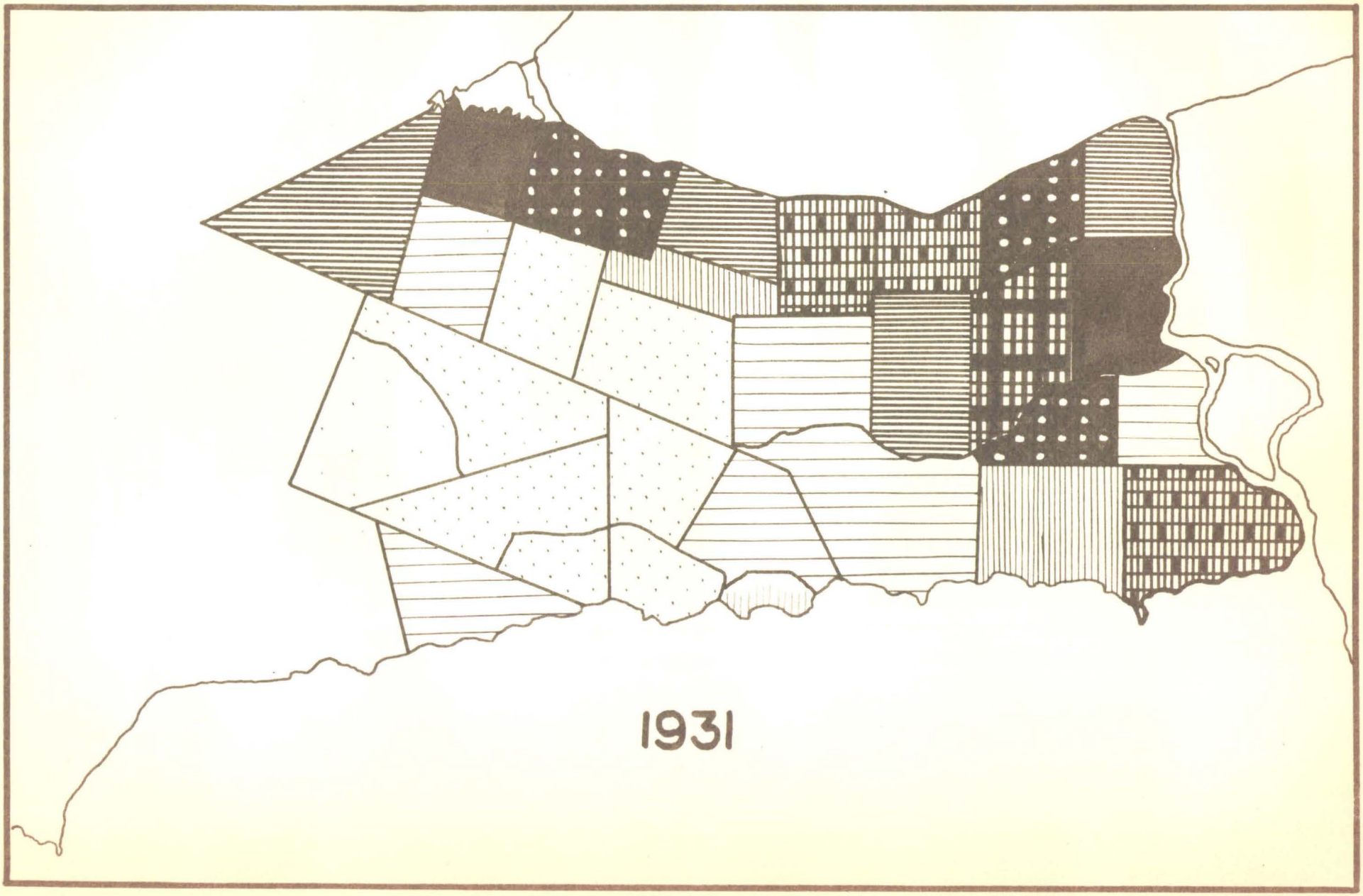
NUMBER of PEOPLE PER SQUARE MILE

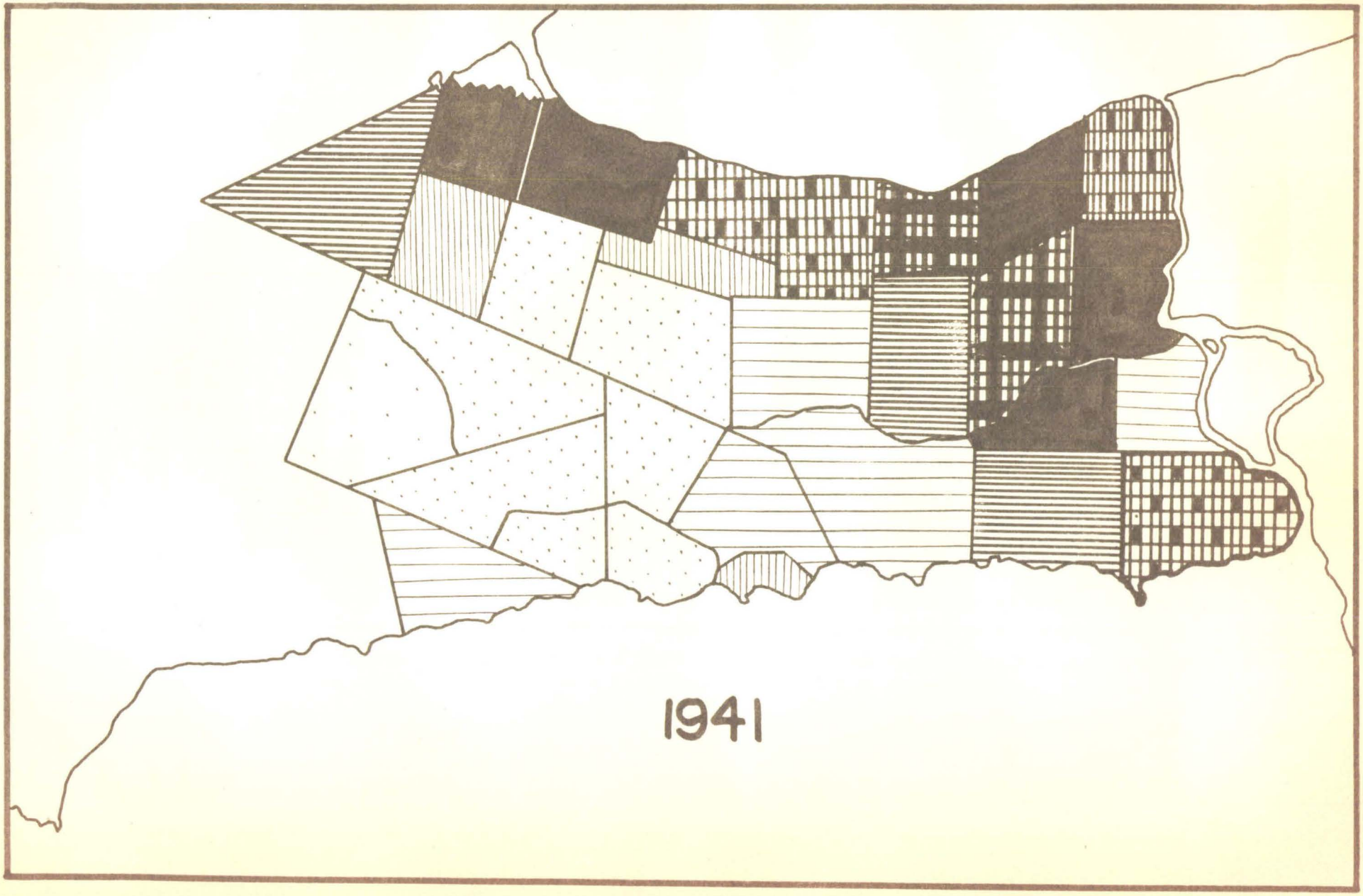
FIG. 10

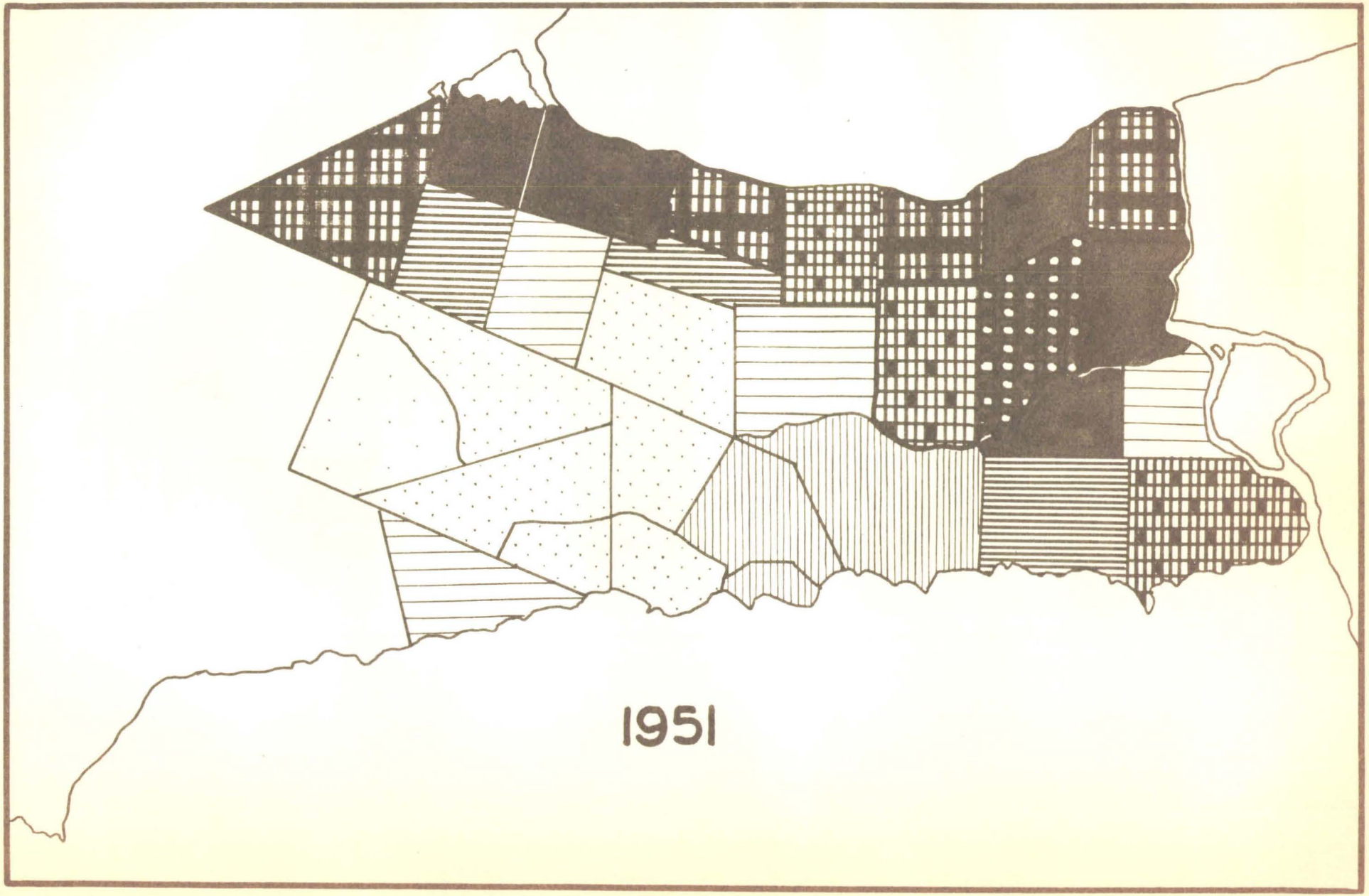

1901


1911


1921


1931


1941


1951

The density maps show that the population has been generally increasing from 1901 onward. Although the growth of the Peninsula's population has been the most striking feature, it has been eclipsed by the concentration of this growth in specific areas. These areas are the Iroquois plain, the banks of the Welland Canal, and the Niagara Falls area. Another outstanding feature is the stability in population from 1901-1951 in the Salina Vale and Lake Erie regions.

Since 1901, the rural population of the Niagara Peninsula has increased by 166%. But this increase has been concentrated in those specific areas just mentioned. Here the rural population has increased by 244%. This can be explained by the rapid growth of suburbs and urban fringes around the large as well as around the smaller centres. In 1901 most of the rural people were associated with farming. In 1951, of the total rural population, only 38% of the people were farmers, and 62% were engaged in non-farming occupations. Let us examine the non farming portion of the rural population within this principal region of growth.

This rural non-farming group is a remarkable feature in the changing population pattern of the twentieth century. The large number of people who live in rural areas yet commute for employment to the cities, prefer the advantages of small towns and are willing to travel relatively small distances to their place of employment. Commuting is a relatively new phenomenon, and is the direct outcome of the

development of easy means of travel and a prosperous economy. But the depression of 1929 brough such growth to a complete standstill. In fact, because of the reduced production of industry and the closing down of many factories, many of the people living in semi-rural areas moved to the large centres like Hamilton and St. Catharines seeking employment. In the late 1930's, there was a slow return of prosperity, and then with the conversion to a wartime economy, rural commuting population increased rapidly. In all the urban regions and along the Iroquois plain, the number of people living in small settlements and working in large centres continues to increase.

On the Iroquois plain, small rural villages such as Fruitland, Winona, and even Grimsby have workers who commute to Hamilton. St. Catharines draws workers from as far away as Beamsville. The development of suitable highways on top of the cuesta has drawn workers from rural settlements to both these centres. The number twenty highway on the Elfrida and Fonthill moraines has been instrumental in linking settlements on the mountain brow with Hamilton. Campden, a small community on the Vinemount moraine acting as a commercial centre for local farms, has many people commuting to St. Catharines for employment. Similar commuting features are found between St. Catharines and Niagara Falls. The urban centre of Welland is smaller than the three previously mentioned urban centres and therefore lacks the economic attraction necessary to draw workers from distant rural areas.

This tendency for suburban growth to expand into rural territory is most pronounced where industries are concentrated. Not only has there been an outward movement of population from urban centres, but there has been a tendency for rural people to remain in the country. This is because rural settlements have changed from service centres into suburban residential districts. At present the serving of rural population is of minor importance as available transportation facilities enable these people to travel to shopping centres which offer a greater diversity in goods. Such conditions can be seen in such towns as Ancaster, Stoney Creek, Homer, and Power Glen.

The other part of the rural population are the farmers. Before 1900, there were several agricultural regions in this rural scene. Nevertheless, as the Peninsula became more highly industrialized, and more densely populated, the influence of the urban market began to be felt. The Iroquois plain became known as the Niagara Fruit Belt characterized by mechanization and specialization in fruit farming. The products of the scarp-foot farms have supplied many canning factories with abundant raw materials. On the moraines along the mountain brow, dairying has blossomed into great significance after 1910 replacing the former general farming practice. The growth of the dairying industry arose from the great demand for fluid milk. The demand came from the increasing urban centres

like Hamilton, St. Catharines, and was aided by improved transportation, recognition of food value, and sanitary regulations.

The advantages of the scarp plain are numerous. The belt of fruit and dairy farming lie within the industrial heart of Ontario which requires both producer and consumer goods. Then the climatic factor is of great importance particularly on the scarp-foot plain where the lake effect gives mild winters and safeguard from frosts. The gentle relief of the land and the favourable soil types have also contributed to the higher farm population per square mile than the other sections of the Peninsula. Once again the significance of excellent rail and road transportation must be emphasized to explain the higher farm population.

This is the only area in the Niagara Peninsula in which the farming population has increased. This can be explained on the basis of the transition from grain farming to fruit farming. Fruit farms require smaller acreage than do general farms. Thus the number of farmers along the Iroquois plain has increased slowly but steadily, as a result of continued subdivision in farm units. To-day, mixed farming has been practically eliminated from the Iroquois plain.

The remainder of the rural population is confined to areas which are at a greater distance from the cities. These include the Salina Vale, sections along the Niagara frontier, and the Lake Erie Lowlands. It is not surprising that there is close correlation between certain elements in the physical

environment, lack of transportation and communication facilities, and a lower population density. The outstanding population features in these areas are the lack of large urban centres, depopulation, and population stability. It was at the turn of the century that population in the rural areas became stabilized, and in some sections to forge ahead slowly.

Oneida Township is the best example of rural depopulation. It reached its peak in 1871 when its population totalled 2,783. Since this time there has been a steady decrease or decline until the number of rural residents reached a minimum of 1,182 in 1941. Since then there has been a slight increase as prosperity has improved somewhat.

What has been the cause of emigration from such townships as Oneida? The rural exodus cannot be attributed to the decrease in the productive capacity of the soil since the maximum population was reached before the maximum productivity of the land was realized. Probably the Township was over-populated initially by the early settlers and they received too much competition from other areas. This might account for the early depopulation. Then when more efficient use of the land and the introduction of labour saving implements helped to contribute in the trend towards rural depopulation. This mechanization of the farms had another effect in continuing rural depopulation. It tended to lessen the dependence of the farmers on the local hamlets. Instead, the farmers looked to larger villages like Hagersville and Caledonia for services. There was no employment for the young people of the

declining hamlets, so they departed to the larger urban centres where employment opportunities were greater. Another factor in rural depopulation, was the depletion of woodlots.

One might conclude that rural depopulation was caused chiefly by the decline of numerous small hamlets, particularly as industrialization attracted them to the scarp-foot area. Then again, consolidation of farm units resulted in further decline in population. Further mechanization may result in more population loss in future in agriculture regions.

In this large, mostly rural, interior and southern part of the Niagara Peninsula, there has been very little change in the twentieth century settlement density and distribution patterns. As has already been stated, rural services provided by small hamlets have declined, as better transportation and communication concentrates and centralizes them in larger towns and the northern cities. Therefore such towns as Hagersville, Caledonia, Dunnville, and Fort Erie have grown steadily. But the rural population has remained fairly stable.

One of the problems of the rural agricultural areas in the last few decades is the seasonal labour shortage. Mechanization and enlarging of farm units freed many of the original farmers from the land for employment in industry. But farm labourers are required in certain seasons of the year, and it is becoming more difficult to locate a suitable labour force. The problem arises since it is not easy for farmers to offer wages which can compete with those offered in industry.

Although it has been the physical environment which accounts for the geographical pattern of village settlement, it has been the economic factor which has conditioned their rate of growth or decline. That is why to-day these small hamlets are declining rapidly in importance to the rural scene as they have all but lost their servicing function. The rural villages are made up of retired farmers who prefer the serenity of a semi-rural community to the bustle of large towns and cities.

Many of these villages had their present position of importance determined by human factors as the development of highways and railways either revived and stimulated growth or else has completed its decline. It is appropriate at this time to study the four main types of villages, according to their geographical location.

(1) Ravine Villages.

These are the settlements which arose to bridge ravines. They are extremely important on the scarp-foot plain, along the Niagara frontier, and in some sections of the Western Erie lowlands. They are located on rejuvenated streams on the scarp foot plain which provide good drainage and usually a bordering fertile plain. Some of the villages of this type which located here in the nineteenth century are Stoney Creek, Grimsby, Beamsville, Jordan, Homer, St. David's, Virgil and McNab on the Scarp-foot plain; Queenston, Chippewa, and Black Creek along the Niagara frontier; and Rainham, Selkirk, Cheapside, and Nanticoke in the Erie Lowlands.

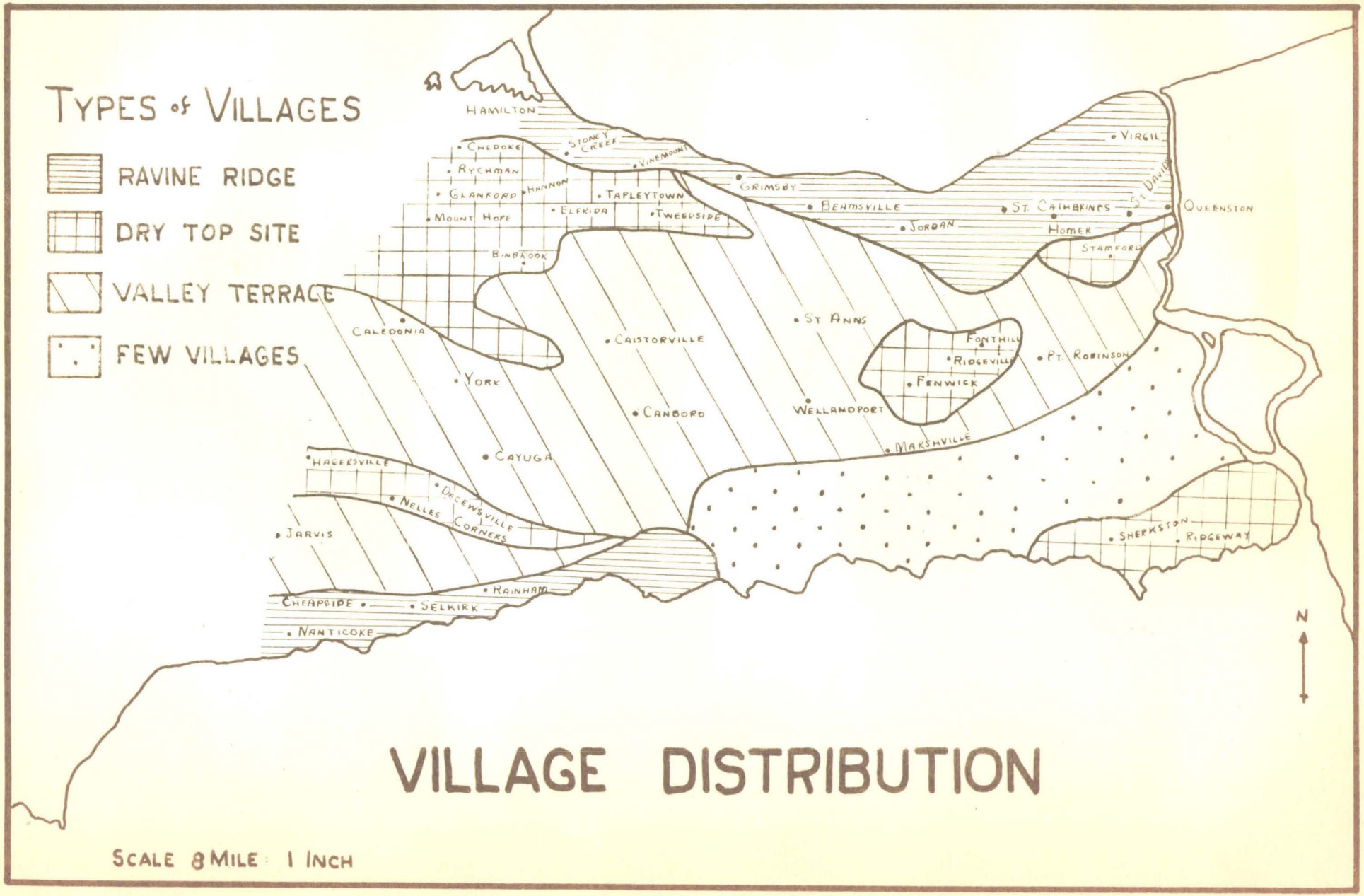

TYPES of VILLAGES
RAVINE RIDGE
DRY TOP SITE
VALLEY TERRACE
FEW VILLAGES
HAMILTON
STONEY CREEK
VINEMOUNT
CHEDOKE
RYCHMAN
GLANFORD
HANNON
TAPLEYTOWN
MOUNT HOPE
ELFRIDA
TWEEDSIDE
BINBROOK
GRIMSBY
VIRGIL
ST DAVIDS
BEAMSVILLE
ST CATHARINES
QUEENSTON
JORDAN
HOMER
STAMFORD
CALEDONIA
CAISTORVILLE
ST ANNS
FONTHILL
RIDGEVILLE
PT ROBINSON
FENWICK
YORK
CANBORO
WELLANDPORT
MARKSVILLE
CAYUGA
HAGERSVILLE
DECEWSVILLE
NELLES CORNERS
JARVIS
SHERKSTON
RIDGEWAY
RAINHAM
CHEAPSIDE
SELKIRK
NANTICOKE
N
VILLAGE DISTRIBUTION
SCALE 8 MILE: 1 INCH

Fig. 11

These villages were very sensitive to changes in communication, since they served their region by road and water. When the revolutionary age came in transportation by the introduction of highways and railways, there developed a re-orientation. The result was the decline of the Niagara and Erie towns, while there was a momentary pause in some of the Lake Ontario villages. But these latter villages have managed to retain their usefulness to the rural population, partly because they are located very close to the main transportation lines and partly because of their location in an expanding economic region. Many of them have continued to grow to the present day. Some have become important towns like Grimsby, Stoney Creek, and Beamsville.

(2) Ridge-top Villages

This group of villages avoid the river sites, dense woodlands, and marshy lowlands. These centres which seek the height of land between the rivers are located chiefly on the morainic deposits of the escarpment brow, the Onondaga cuesta, and the few beach ridges of the Erie Lowlands. The villages have responded to the use of well-drained sites. They have functioned as community centres for the surrounding farmers. The principal villages in this classification are Elfrida, Mount Hope, Tapleytown, Tweedside, Ancaster, Glanford, Fonthill, Ridgetown, Hannon, Chedoke, Ryckman, Fenwick, and Binbrook on the moraines; Hagersville, Skerkston, Decewsville, Wainfleet, Ridgeway, Lowbanks, on the Onondaga cuesta and Erie beaches; Fruitland is located on the Iroquois beaches. Some of these centres, particularly Hagersville, have been

stimulated by road and rail connections to the large cities.

Significantly, when one does find these centres in the interior sections of the Peninsula unrevived by good transportation facilities, it is to find a declining or abondoned settlement. This is especially true since river settlements at good crossing points have become more important than the old neighbourhood settlements. The result is a group of declining ridge-top villages such as Abington, Caistor Centre, and Winslow.

(3) River Terrace Villages:

These villages avoid the wet intervale areas and cling to the better drained parts of river valley. Rejuvenated rivers make the best sites. However, the surrounding locations are generally more poorly drained than areas adjacent the previously mentioned sites. The villages have been associated with general farming practices. The most important rivers associated with this type of village are the Twenty Mile Creek, the Welland and Grand Rivers. Some of the villages characteristic of this type of settlement are St. Ann, Wellandport, Caistorville, Canboro, Cayuga, Caledonia, Jarvis, York.

Many of the river sites are gradually declining, as their functions in distributing and collecting are being concentrated in just a few large centres. Growing towns like Dunnville and Caledonia have been re-enforced in their functional purpose by good bridge crossings.

(4) Remaining Villages

There are very few villages of any importance left to be discussed. Formerly there were some villages that skirted the edge of the interior depression. But such settlements are found very close to poorly drained sections with the result that their functional location to the rural area has never been very great and was easily replaced by large villages and towns, which had a great deal more to offer the rural population.

Summary of Rural Population

Compared to the immense strides made by urban development in the past sixty years, rural population growth has been small. The rural depopulation of late nineteenth and early twentieth century has finally stabilized. In some sections near urban districts it has even increased. This increase is due primarily to a rapid growth in the rural non-farming population and an extraordinary growth in suburban areas.

In general we might say that major rural population increases have occurred along the scarp-foot plain; lesser increases are shown in the kame and terminal moraine areas; little change or even slight decrease is characteristic of the interior vales. The reason for this decrease is truly indicative of the physical environment which is a flat monotonous plain with a generally uniform heavy soil with poor drainage and a more extreme climate.

In conclusion, the rural population as a whole has been greatly influenced by each change in transportation and each new emphasis in economic development. This has caused a shift in population. But the past and present population pattern still shows the effect of the environment on settlement and human development.

URBAN POPULATION DISTRIBUTION

The urban history of the Niagara Peninsula has been relatively short, just over a century in length but it has been very active. The major changes that have been produced in the urban history can be related to the various stages and developments in transportation and communication. The chronological history of urban location and importance began with the growth of towns along the lakeshores and Niagara gorge about 1800. The construction of the canal in 1835 opened the Salina Vale and gave rise to a series of towns located at central sites such as St. Catharines, Thorold, and Welland. This caused the Niagara gorge towns to decline in importance as their transportational function was assumed by the canal towns. Then after 1850, the railway age placed a new emphasis on transportation causing a new pattern of settlement. It challenged the transportational function of the canal region and gradually transformed the Peninsula into a region revolving about Hamilton at the head-of-the-lake. The 25th century has seen the development of automobiles and highways resulting in the stimulation of the Niagara gorge towns which have good bridge sites.

The Welland canal followed a belt of weakness where pre-glacial erosion had dug deep into the rock structure. This facilitated excavation for the canal as only glacial debris had to be removed.

The modern pattern of transportation routes radiating outwards from Hamilton reflect the influence of geography. Breaks in the Niagara cuesta created by stream erosion have allowed highways to reach the dip-slope level. Transportation

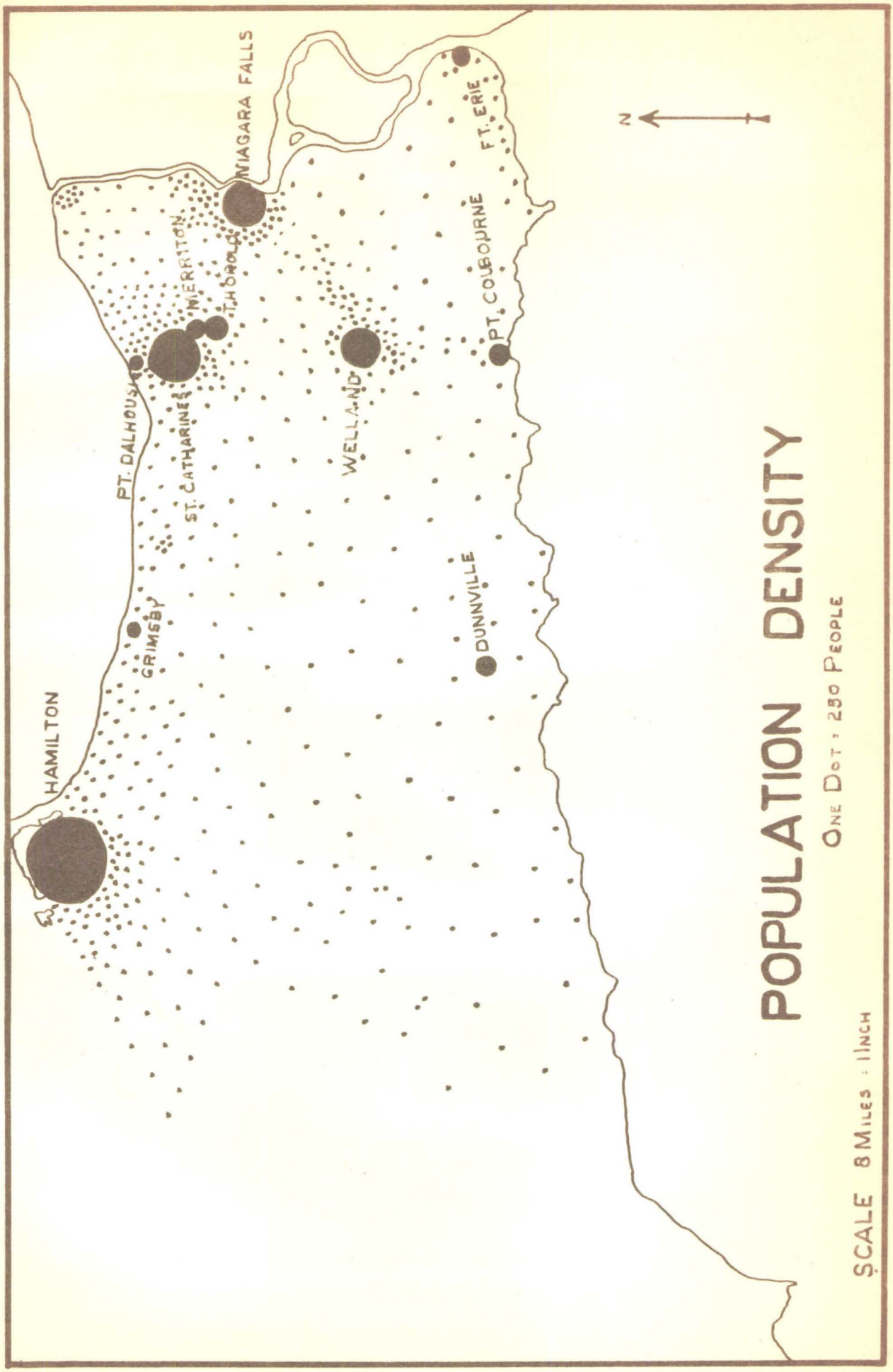

POPULATION DENSITY
ONE DOT = 250 PEOPLE
SCALE 8 MILES = 1 INCH
N
HAMILTON
GRIMSBY
PT. DALHOUSIE
ST. CATHARINES
THOROLD
NIAGARA FALLS
WELLAND
DUNNVILLE
PT. COLBOURNE
FT. ERIE

FIG. 12

has succeeded in overcoming some of the barriers imposed by geography by using the favourable physiographic features to link the region together. In so doing, it has helped to emphasize the importance of Hamilton to the Niagara Peninsula. Likewise the other three leading urban centres, St. Catharines, Niagara Falls, and Welland--taking advantage of their geographical location and excellent transportation facilities have grown.

So far we have seen only how urban development was affected by transportation. This is related very closely with the physical environment. Now let us turn to the economic evolution of the Peninsula which has regulated the rate of growth of urban population.

The urban changes have greatly reflected the economic changes through time. The earliest white man economy was strictly pioneer with interest in fur trade. The only settlements were the portage ports and defensive forts. This occurred during the French period and was found along the Niagara River. The coming of the British settlers and their interest in agricultural settlement saw the change from pioneer to domestic economy. This type of economy required local villages to serve the needs of the farmers. The towns started to develop small industries like grist and flour mills. The evolution of transportation permitted the importation of a greater variety of raw material s to the local industries. The farmers began to specialize and to become commercial rather than subsistence farmers. A transition period towards the end of the 18th Century followed while industrialized of urban centres increased at the same time as commercial

farming practices were being adopted. By 1900, the economic conditions had more or less passed through the initial stage of transition from generalized farming and domestic industry, to specialized farming and international industry. The twentieth century has only intensified both these aspects of the economy. The urban settlements have responded to the changing patterns of the economy. The consequence has been for a new pattern of urban centres depending largely upon industry for their welfare.

A short study of industrialization is necessary to fully appreciate the urbanization of the Peninsula. It must be remembered that it was commercial activity which first brought the Niagar Peninsula into prominence before industry arrived, and also brought the demand for industrial goods to the area. Since the local centres were unable to mee t the demand, better centred towns began to receive concentrated industrial development. The Peninsula began to take on an industrial rather than commercial pattern of towns. Let us now turn to examine the industrialization of the area, seeing why it has concentrated at specific points and its effects upon population.

INDUSTRIALIZATION

Industry has resulted from different opportunites. This is not related as closely to the presence of raw materials, as to the geographic location in national and international life. The first industries in the Peninsula were grist and saw mills in the hilly areas away from the chief transportation routes. Water power provided by local streams was the principal locative factor. There was a very irregular distribution and

they served only local needs. The advent of the railway along with new industrial techniques produced a loosely-knit linear group of industrial towns along the scarp-foot plain.

Such a transition came about because the textile industry, for one, branched out into cotton and silk production. The railways freighted the raw goods from U.S.A. into the Peninsula where the industrial towns located along the railways produced finished articles for distribution in Canada. In the 1870's and 1880's the adoption of protection tariffs helped forward the industrial sites of the Peninsula. At the same time, a trend can be seen whereby the railway locations are becoming more important along the canal sites. St. Catharines and Welland continued to grow more rapidly than the other canal cities as their sites were stimulated by railway communication. But the canal sites were favoured in a later period because of their nearness to the principal power stations of the Peninsula. Therefore the smaller towns like Thorold, Merriton, and Port Colbourne have continued to grow. The railway, therefore, began to reinforce industry at specific points.

The industrial centres producing nodal points was the next sequence, following the linear alignment of towns. This process began slowly around 1900, but by 1955, we see industry concentrated at four principal nodal points which have international contact. They are Hamilton, St. Catharines, Niagara Falls and Welland. This is where the large scale, modern factories are found. Iron and steel industries have been the characteristic feature of the nodal situation.

Hamilton, because of its concentration of large factories, harbour and transportation facilites has come to handle the basic production. The other cities and towns have been specialists in various steel and iron products. Throughout the 20th Century, the steady process of specialization, integration, and concentration stands in the forefront.

Once industrialization was fully applied under the impact of railway and hydro-electric power, the change that occurred in the Peninsula in the way of urban-rural phenomenon was similar to the changes produced by industrialization elsewhere. To begin with, the main axis for the Peninsula shifted from the canal to Hamilton. It created the changes that form the base of the region's present economic and social environment. The industrialization process prepared the way for a marked accelleration of population growth in the Peninsula after the turn of the century. The nodal points with their large populations show that the advantages presented by geography have been utilized and that man himself has emphasized these sites by his inventiveness, particularly in transportation and power.

One of the most outstanding features of the Niagara Peninsula is the concentration of the population in four cities- Hamilton, St. Catharines, Niagara Falls, and Welland. 57% of the population live in four cities, while no less than 42% of the population of the Niagara Peninsula are living in Hamilton alone. The main reason for the concentration of population in these four centres is the economic opportunities offered to

the people. High wages, favourable standard of living, employment, entertainment--all contribute to the attractions which appeal to the people today. The attractions and opportunities have increased with each decade intensifying the urbanization process of the four cities. The four cities have increased their 1901 population by over four times, while the Peninsula as a whole has only increased its population by 3 times. So the economic attractions of the urban centres has had a great influence on their growth.

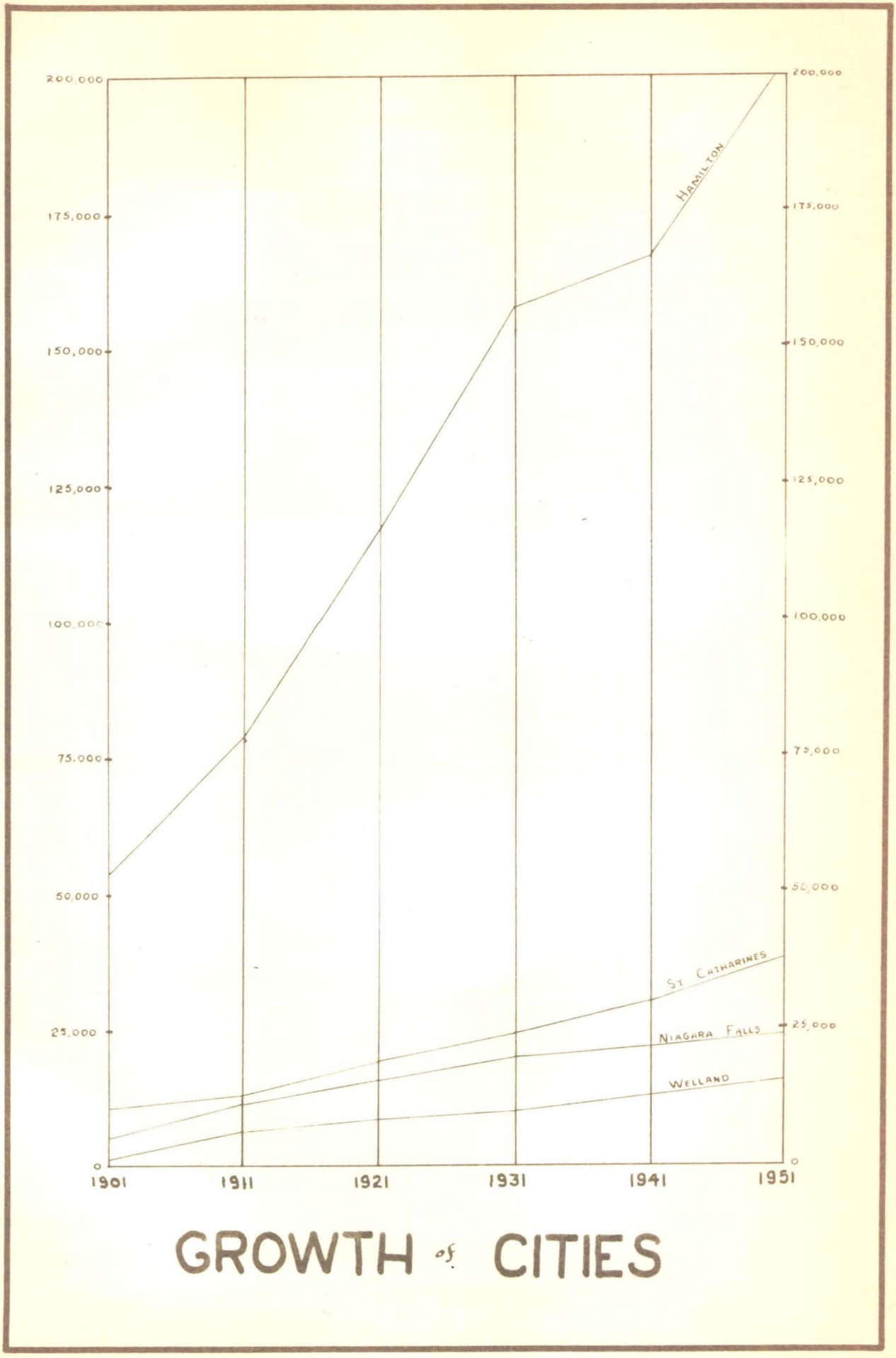
The urban population growth has been caused not by increased fertility or birth rate, but by a decrease in death rate and by immigration. Industrialization, almost everywhere, is associated first with marked population increases, and then with a trend toward a lower birth rate. The four cities have experienced steady and continuous growth since and before 1900. The industrial centres have had a decrease in birth rate since the opening of the century, and therefore immigration has played an important role in the growth of the cities. The explanation for the drop in birth rate is the changed social and cultural conditions that have appeared in the urban development and industrialization of the Niagara Peninsula. The influence of people which has more than counterbalanced the drop in birth rate has been of two kinds. First from local rural areas to the cities. Second from outside the areas both in Canada and abroad. During the two world wars, special conditions produced by war, such as wartime romances, increased the birth rate which compensated for the loss of immigration from abroad.

This was particularly true of the second world war which had an increased marriage rate and birth rate. Since the war a high birth rate and renewed immigration has once more begun, The result has been for a more rapid rise in the population of the urban centres. This is partly true for Hamilton and the smaller towns. The probable explanation for the continuance of this trend towards many births and rapid population growth lies in the biological impact of numerous marriages since 1945, increased immigration, revival or maintenance of wartime social and economic conditions.

Thus we see that the four cities, favoured by geographical location, have come to dominate the region in many ways, one of which is population.

At the same time as there has been a continued aggregation of population in these four cities, there has been a continued growth of suburbs and towns as well. In fact, there has been an extraordinarily rapid growth in the last fifteen years in both these areas. The tendency toward smaller town growth was similar in all sections of the Peninsula. Suburbs are more pronounced around the four large cities. The decentralization of industry along with improved transportation and communication facilities has stimulated this feature. No longer are rural areas isolated from the social life of urban centres.

Another feature of urbanization in the Peninsula is the greater percentage of total population living on non-farming land. The small proportion of present agricultural population is a remarkable feature. Yes, these few people living on the farms are only partially a tremendously large non-agricultural



GROWTH of CITIES

FIG. 13

population. It has been possible only because the land is productive, and mechanization has freed many formerly required farm workers. The result of this last process has largely contributed to the decline in the farm population. The growing urban population in the north and east portions of the Peninsula means a larger market for the farmers. Aided by quicker and easier transportation they are taking advantages of the greater agricultural demands of home and industry. The proximity to a prosperous agricultural area has helped to stimulate the growth of cities and towns. The manufacture of farm machinery and equipment, farm products, and distributing of goods and services for rural areas are supplied by the cities and towns of the Peninsula. The urban and rural regions of the Peninsula are not totally dependent on each other, as many of the products of each are sold outside the region. But they do offer great benefits and services to each other.

STUDY OF POPULATION OF THE FOUR CITIES

(1) Hamilton

This city is by far the largest in the Peninsula, and it dominates the industrial life of the area. Not only has Hamilton grown much more quickly than any other part of the Peninsula but the region about it has also expanded rapidly in population. There are many small towns lying close to Hamilton which offer markets and a labour force for the city. Stoney Creek, Waterdown, Ancaster, Burlington and Dundas are all within a few miles of this metropolitan centre and are closely connected with Hamilton in many ways.

Hamilton, in 1955, has a population of 216,000. Except for the depression years of the thirties, it has grown very rapidly since the 20th century began. The principal cause for its growth is the location at the head-of-the-lake for the development of industry.

The new industrialization has brought a large immigrant population to the city. As immigration increases from the continent, the number of foreigners increases. This can be seen in the following table.

		1951	1941	1931	1921	1911	1901
Actual Numbers	(Total	208,321	166,337	155,547	114,118	77,172	52,634
	(British People	140,745	127,947	122,196	94,044	61,900	45,930
	(Foreigners	67,576	38,390	33,351	20,079	15,272	6,704
% Growth	(British	68%	77%	78%	82%	80%	87%
	(Foreigners	32%	23%	22%	18%	20%	13%

The British portion has been dropping fairly steady since 1900 because of wars, not only in numbers but in proportion to the total population. The foreign element in Hamilton is increasing partly because of south-eastern Europe immigration from within the Peninsula and also from without. The foreign elements tend to drift to the large cities in the area such as Hamilton, leaving the British people to dominate the smaller towns and rural areas. Fortunately, industry has been able to absorb the flow of people to Hamilton.

The urban pattern and expansion has reacted very closely to the constriction of the Niagara escarpment, unequal development of the coastal plain, the entrance of the Dundas Valley, and the presence of two bay bars. Every stage of growth

has had to overcome one or more of these geographical problems. Its geographical position made it necessary that the barriers and difficulties be overcome. The entire history of Hamilton and its surrounding lands has therefore been a response to the local geography. From agriculture to commerce to industry, the location has been the prime factor for its continued growth and development.

Hamilton is still a rapidly growing city.

	1901	1911	1921	1931	1941	1951
% Rate of Growth		48%	48%	37%	8% depression years	30%

It will remain the largest urban centre in the Peninsula.

(2) St. Catharines

The City owes its growth and development to the Welland Canal, the development of electrical energy at Niagara Falls. Other towns in the area have also been associated with the canal, but St. Catharines was stimulated by rail and road network which enforced its ravine bridge site on the scarp-foot plain.

In 1951, the city had a population of 37,984. St. Catharines has several satellite towns--Port Dalhousie, Merritton, Thorold. St. Catharines constitutes one of the rapidly expanding sections in conurbation which is now engulfing the western end of Lake Ontario. St. Catharines and her surrounding towns constitute another important industrial region in the Niagara Peninsula. Industrialization helps to account for St. Catharine's large population.

1951	1941	1931	1921	1911	1901

	1951	1941	1931	1921	1911	1901
(Total	37984	30,275	24,753	19,881	12,484	9,946
(British	25889	22,699	19,683	16,744	10,198	8,522
(Foreign	12095	7,576	5,070	3,137	2,286	1,424
(British	68%	75%	80%	85%	82%	86%
(Foreign	32%	25%	20%	15%	18%	14%

As in Hamilton, the proportion of British people in St. Catharines is falling off in contrast to the rising foreign element.

St. Catharines does not have its industries rooted in the surrounding region. It is not dependent upon local resources. But trade does exist between St. Catharines and the rest of the region. St. Catharines has aided the growth of the smaller towns surrounding her, and offers markets and processing plants for the local farmers.

	1901	1911	1921	1931	1941	1951
% Rate of Growth		25%	59%	25%	22%	25%

Except in the decade which included WorldWar 1, there has been an increase of St. Catharines population. This can also be seen in the population trend chart.

Like the other two cities at the eastern end of the Niagara Peninsula, St. Catharines is located outside the better Canadian markets. Its influence in New York State is restricted by Niagara Falls, Ontario and Buffalo. Therefore, although it does lie in an expanding industrial conurbation, there is a limit as to its future growth.

(3) Niagara Falls

This city has a variety of interests being a tourist city as well as an industrial centre. International road and rail bridges have stimulated trade. Niagara Falls is also famous for its great hydro-electric plants which supply the rest of the Niagara Peninsula with cheap power. All these factors have given an impetus for its population expansion since 1900.

In 1951, Niagara Falls had a population of 22,874. Its expansion can be seen in the joining of Niagara Falls and the town of Clifton. The factories grew so rapidly between the two places, that a residential zone did not have any opportunity to develop before the two places united. Niagara Fall's growth has been extremely rapid.

Niagara Falls must compete with St. Catharines and Welland for a labour force. Unfortunately, the townships south of the city are very few and do not have any large surplus population for rural-urban migration.

	1951	1941	1931	1921	1911	1901
Total	22,879	20,589	19,046	14,764	9,248	4,244
British	14,869	14,755	13,991	12,507	7,076	3,895
Foreign	8,005	5,834	5,055	2,257	2,172	349
British	63%	73%	73%	85%	77%	92%
Foreign	37%	27%	27%	15%	23%	8%

Once again we see how a predominantly British city gradually changes in character in a fifty year period. The change is particularly striking in Niagara Falls because of the

greater percentage of British people living in the City in 1900. By far the largest single group is the Italians who constitute 12% of the total urban population. French and Germans are found in relatively few numbers, while other European countries each have no more than a couple of hundred representatives in Niagara Falls.

% Rate of Growth	1901	1911	1921	1931	1941	1951
		118%	59%	29%	8%	11%

Niagara Falls is different from Hamilton and St. Catharines in that its rate of growth has dwindled rapidly since the turn of the century. The industrialization of the City began rapidly about 1900 giving tremendous impetus for immigration.

It must be remembered that Niagara Falls has several limitations which do not favour population growth. It faces two large American cities across the river--Buffalo and Niagara Falls; she has a relatively poor agricultural region to the south; and she has to compete with such near by centres as St. Catharines, Welland and Hamilton.

Although Niagara Falls will continue to grow, its rate and increase will probably continue to be slow and gradual.

(4) Welland

This city is located at the junction of the Welland River and Welland Ship Canal. The realization of Welland's strategic position on water and rail connections in the Salina Vale led to her rapid development and growth in the

early decades of the century. But as competition from other centres like Niagara Falls and St. Catharines increased, Welland's population growth decreased rapidly to a more steady rate of growth. Welland is located away from the main axis of activity within the Peninsula--the scarp-foot plain. Early in the 20th century it began to develop into a manufacturing centre. Its industrial development has increased in the last few decades.

The change from British to foreign dominance is a unique feature of Welland.

	1951	1941	1931	1921	1911
Total	15,382	12,500	10,700	8,650	5,310
British	7,652	6,800	6,160	5,110	3,250
Foreign	7,730	5,790	4,540	3,540	2,060
British	49%	54%	57%	59%	61%
Foreign	51%	46%	43%	41%	39%

The foreign element is even greater around Welland in the Township of Crowland, where 69% of the people are non-British. The predominant foreign groups are the French, Hungarians, and Italians. Welland has always been a great attraction for south-eastern Europeans.

Community consciousness is rather difficult to arise, since Welland remains primarily an industrial centre. Few cultural or recreational facilities have been provided for the people because of Welland's close proximity to Buffalo, Niagars Falls, and Crystal Beach.

	1901	1911	1921	1931	1941	1951
% Rate of Growth		183%	63%	24%	17%	23%

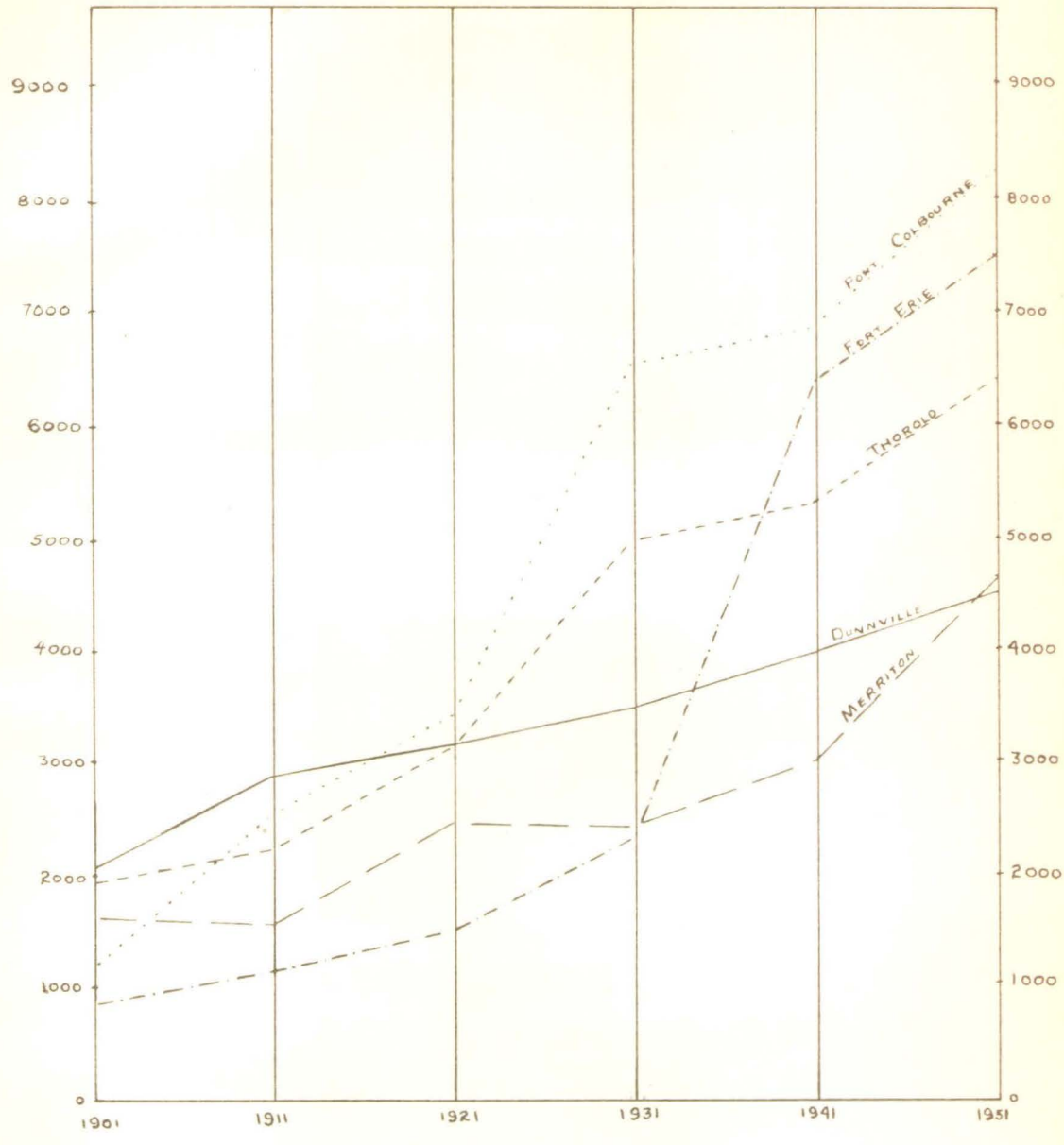
Welland's location on the Welland Canal and as the chief nodal point in the Salina Vale accounts for her continued growth.

(5) Towns of Niagara Peninsula

Although the four cities of the Niagara Peninsula dominate the urban picture, there are numerous towns which have played an important part in the development of the area. The density and distribution of these towns reflect the needs of the rural areas. The towns are located throughout the Peninsula at intervals so that they may serve the rural population as well as possible.

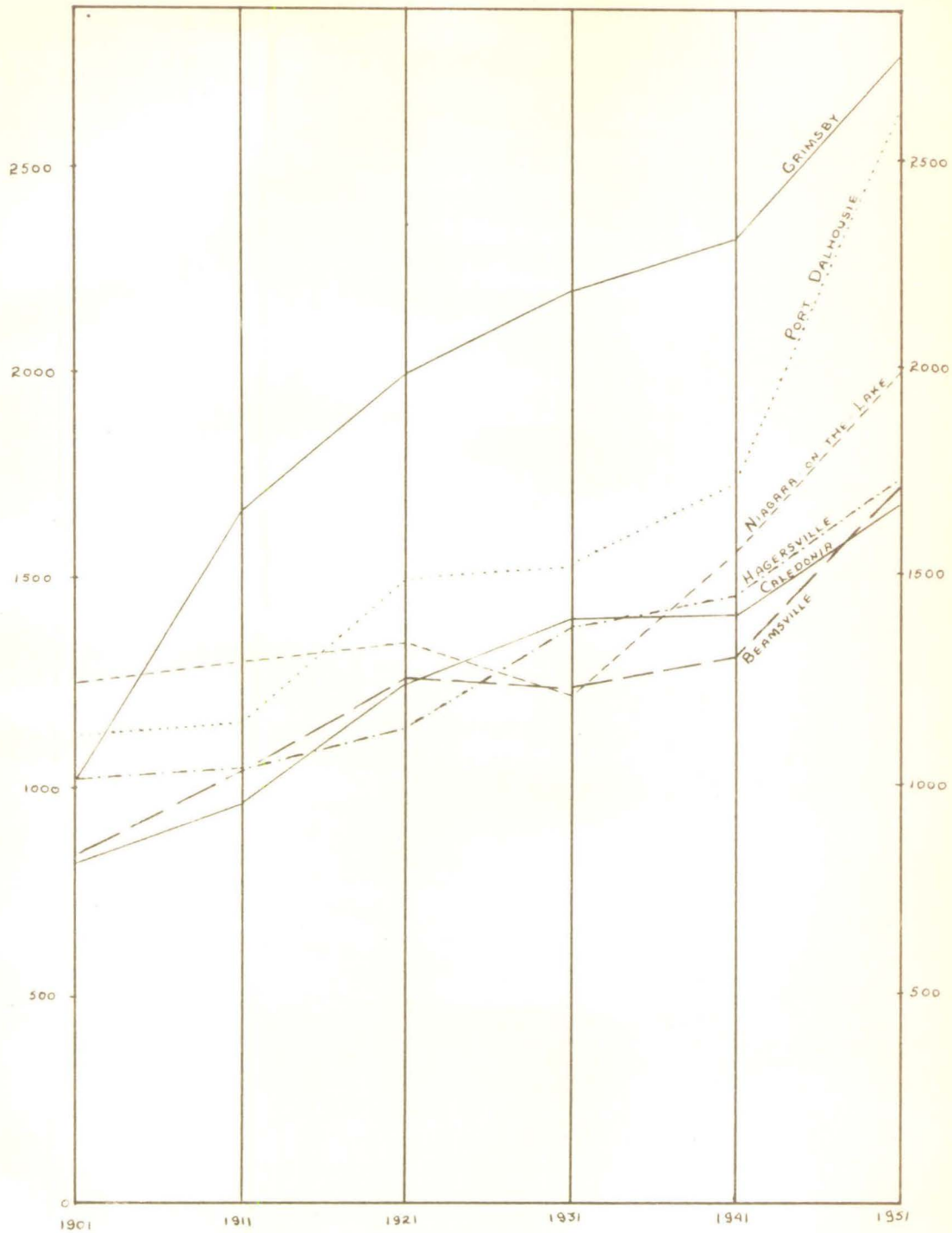
There is a definite arrangement of the towns: Along the Niagara River, down the Welland Canal, along the scarp-foot plain, down number six highway, and along the Erie Lakeshore (Dunnville, Port Colbourne) The areas in between have no towns of any importance. They are served by local villages. Thus the two areas which stood out on the density maps as having low population densities (1) between the Niagara River and Welland Canal and south of the Welland River, and (2) between the Welland Canal and the number six highway and south of the Niagara escarpment, now stand out as having practically no urban centres. The pattern of towns reflects the geography of the Peninsula. Caledonian and Hagersville show the influence of the highway from Hamilton to Port Dover which gave these towns preference over the other villages.

The towns have a different ethnic structure from that of the cities. We saw that in the four large urban



GROWTH of LARGE TOWNS

FIG. 14



GROWTH of SMALL TOWNS

FIG. 15

Port Colbourne

	1951	1941	1931	1921	1911	1901
Total	8275	6993	6503	3415	1624	1253
British		3219	2824	2170	1110	907
Foreign		3774	3678	1245	514	346
British		46%	43%	64%	68%	73%
Foreign		54%	57%	36%	32%	27%

FortErie

	1951	1941	1931	1921	1911	1901
Total	7,572	6,595	2,383	1546	1146	890
British		4,922	1,695	1146	716	736
Foreign		1,633	688	400	430	154
British		75%	71%	74%	63%	82%
Foreign		25%	29%	26%	37%	18%

Thorold

	1951	1941	1931	1921	1911	1901
Total	6397	5305	5092	4825	2273	1979
British		3027	3188	3075	2049	1729
Foreign		2278	1904	1750	224	250
British		57%	63%	63%	90%	87%
Foreign		43%	37%	37%	10%	13%

Merritton

	1951	1941	1931	1921	1911	1901
Total	4714	2993	2523	2544	1670	1710
British		2582	2147	2042	1544	1508
Foreign		411	376	502	126	202
British		86%	85%	80%	92%	88%
Foreign		14%	15%	20%	8%	12%

centres, there has been a gradual and steady decline of the British proportion of the urban population. Only Port Colbourne and Thorold show this increased foreign element. This can be explained partially by the fact that both have industrial functions along with their commercial functions. While in the other towns which have retained their predominantly British population, the main function is still commercial. When the south-eastern Europeans arrived after 1920 in large numbers, they moved to industrialized urban centres where employment opportunities were greater.

The following charts will indicate the British-foreign trends from 1901-1941.

Conclusion

The economic changes have been the chief forces that have controlled the rate of growth of the towns and cities. But it is a combination of these two, the geographical and economical environments, that has contributed to the continued aggregation of population in urban centres. The result has been the emergence of Hamilton as the extraordinary industrial centre of the Peninsula characterized by a rapid population growth, the steady growth of St. Catharines, Niagara Falls, and Welland into leading urban centres; and the slow growth of smaller towns like Port Colbourne, Fort Erie, Thorold, and Merritton into more local centres.

Dunnville

	1951	1941	1931	1921	1911	1901
Total	4478	4028	3405	3224	2861	2105
British		3315	2833	2751	2090	1508
Foreign		713	572	473	771	597
British		82%	83%	86%	73%	72%
Foreign		18%	17%	14%	27%	28%

Grimsby

	1951	1941	1931	1921	1911	1901
Total	2773	2331	2198	2004	1669	1001
British		1904	1758	1649	1306	722
Foreign		427	440	355	363	279
British		81%	82%	83%	78%	72%
Foreign		19%	18%	17%	22%	28%

Port Dalhousie

	1951	1941	1931	1921	1911	1901
Total	2616	1723	1547	1492	1152	1125
British		1498	1288	1301	967	937
Foreign		325	259	191	185	188
British		86%	83%	87%	85%	84%
Foreign		14%	17%	13%	15%	16%

Niagara-on-the-Lake

	1951	1941	1931	1921	1911	1901
Total	1681	1401	1393	1223	952	801
British		1211	1079	973	835	684
Foreign		190	314	250	117	117
British		86%	77%	80%	88%	86%
Foreign		14%	23%	20%	12%	14%

Hagersville

	1951	1941	1931	1921	1911	1901
Total	1746	1455	1385	1169	1106	1020
British		1105	1148	884	824	805
Foreign		350	237	285	282	215
British		76%	83%	76%	75%	79%
Foreign		24%	17%	24%	25%	21%

Beamsville

	1951	1941	1931	1921	1911	1901
Total	1712	1309	1203	1256	1096	832
British		945	833	1146	712	560
Foreign		464	370	110	384	272
British		72%	69%	90%	65%	68%
Foreign		28%	31%	10%	35%	32%

Caledonia

	1951	1941	1931	1921	1911	1901
Total	1681	1401	1393	1223	952	801
British		1211	1079	973	835	681
Foreign		190	314	250	117	120
British		86%	78%	79%	88%	85%
Foreign		14%	22%	21%	12%	15%

The various foreign groups such as French, Germans, Dutch, Italians, Austrians, Poles and Hungarians are very few in number. If any of the groups dominate it is the Germans and French. The exceptions are Port Colbourne and Thorold where they had the Hungarians and Italians dominating foreign groups respectively. This can be expected because of their local industries and their proximity to Welland. As long as the south-eastern Europeans prefer the industrial locations for immigration, the towns of the Peninsula will probably remain strongly British in character.

ETHNICAL DISTRIBUTION

The ethnical distribution of the population in the Niagara Peninsula since 1900 has varied considerably. This is due in part to periods of immigration and also to the mobility of the population. The large-scale movements of Europeans has increased the white population and has brought elements of their culture to this region.

Some of the chief causes of migration in the nineteenth and twentieth centuries will now be mentioned. In the nineteenth centry, immigration was influenced by the search for suitable agricultural lands, political oppressions, and religious persecutions. The twentieth century saw the effects of social pressures and movement for better economic opportunities. As the twentieth century progressed, industrialization and urbanization grew increasing the density of population. There was a marked increase of immigration after 1900, when the Anglo-Saxon people no longer dominated the immigration picture. Instead, peoples from the more easterly and southern sections of Europe flowed with increasing numbers to the Peninsula.

Before proceeding to a discussion of the distribution of various ethnic groups in the Peninsula since 1900, it must be pointed out that census figures for 1951 origin groups on a township basis was not available. This will limit the study for the most part to the period ending in 1941.

The following table will indicate the increase and decrease of the various ethnic groups between 1901-1941:

Ethnic Group	1901	1941
English	37.0 %	47.2%
Scottish	13.5	16.6
Irish	24.4	13.4
Great Britain	74.9	77.2
German	20.5	5.2
Dutch	1.0	3.1
Italian	.0	3.9
French	1.6	3.2
Poles	.0	2.8
Ukranians	.0	2.8
Remainder	2.0	1.8

Certain facts about European immigration since 1900 stand out in relation to the Niagara Peninsula. The peak years of emigration from such countries as Austria, Italy, and Hungary were 1906 and 1907. Yet the Niagara Peninsula had relatively few ethnic groups from this part of Europe by 1911 because it did not offer the same economic opportunities as other areas did. Those Austrians, Hungarians, and Italians who did arrive before 1911, settled in Stamford, Humberstone, Crowland, and Bertie Townships where land was available and mixed ethnic groups were already present. It was not until after 1921 when the Peninsula became more industrialized, that any large scale immigration from this part of Europe was encountered in the Peninsula. This period from 1911-1921 was marked by a rapid increase of Italians and Austrians in the canal cities when work on the new canal was begun in 1913; and by the Austrian farmers in the empty agrable land lying on either side of the Welland Canal in the Salina Vale. Therefore, it can be generally stated that the mass of south-eastern European emigration was felt in the Niagara Peninsula several

years after the movements actually took place.

Another feature of overseas emigration from south-eastern Europe is that this area has never recovered its 1914 volume. Yet, aside from the nineteenth century emigration of British and German immigrants, there was relatively no period of great influx of immigrants into the Niagara Peninsula. This is true of the 1900-1914 period when south-eastern European emigration reached such tremendous proportions that it surpassed many of the previous records established by the north-western countries of Europe. But looking at the census figures for the Peninsula we see no major increase in the numbers of people of south-east European descent until after the great war of 1914-18.

The decline of British immigrants has been noticeable everywhere except along the Iroquois plain. It is to the areas avoided or abandoned by British immigrants that Poles, Italians, Hungarians, Austrians, and more recently Ukranians, have settled after leaving their homelands in Europe. The Italians are the chief exception as they are great urbanites, and therefore have come to be more widely distributed throughout the Peninsula wherever urban centres are found.

It has already been inferred that certain ethnic groups prefer urban centres to rural areas. This is a characteristic which has been brought over from Europe with them. The British people, for example, are also great urbanites. This is partly due to their early association with industrialization. Therefore it is not surprising to find the British people dominating the urban centres. The British people, being here first, occupy

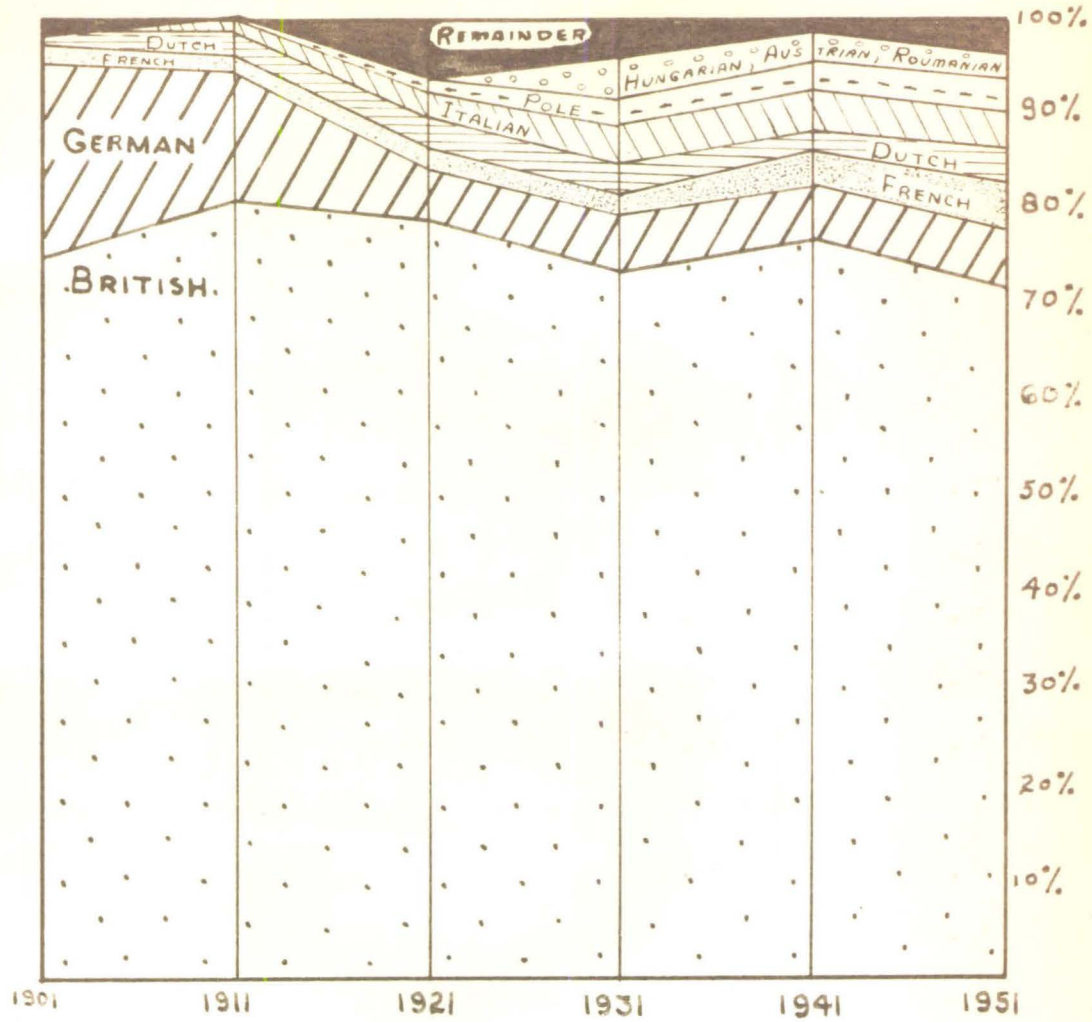
the most favourable agricultural sites. The following table will indicate the proportion of ethnic groups in rural and urban areas in 1901-1941.

1901

Ethnic Group	Total Number	Rural %	Urban %
English	54,013	33.	67.
Scottish	21,826	30.	70.
Irish	30,887	27.	73.
British	106,726	30.6	69.4
German	26,605	71.0	29.0
Dutch	1,504	57.5	42.5
French	2,193	37.	63.

In 1901, the remaining ethnic groups were very few in number and scattered throughout the Niagara Peninsula. At this time, they make up only 2% of the total population, and therefore their rural urban distribution is relatively insignificant. However, in 1941, their importance within the Peninsula has increased as they now form 12% of the total population. Some of the numerically small groups, like the Jews, have been included just to show which groups are predominantly urban, and those groups which still have a large rural character.

	1941		
	Total number	Rural %	Urban %
English	169,846	26%	74%
Scottish	59,504	23	77
Irish	48,222	27	73
British	277,572	26	74
German	18,708	53	47
Dutch	13,198	53	47
French	11,349	23	77
Italian	13,814	13.5	86.5
Polish	10,100	15.5	84.5
Jews	3,618	7.	93.
Austrians	1,515	38.	62.
Hungarians	8,664	27.	73.
Ukranians & Russian	8,900		
Czech		42.	58.
Finnish	516	33.	67.
Russia	1,893	39.	61.
Scand.	2,042	23.	77.
Ukrainian	6,890	41.	59.
Romania	2,036	30%	70%
Chinese	536	12.5	87.5
Total of Niagara Peninsula	388,477	27.6%	72.4



ETHNICAL PERCENTAGES

FIG. 16

With this introduction to ethnic groups, we may now examine each group in more detail, studying the distribution of each throughout the Niagara Peninsula.

British People

This group is composed of Scots, Irish, and English. In the middle of the nineteenth century and down to its closing years, most of the British immigrants were agricultural labourers. The rate of British immigration to the Niagara Peninsula declined towards the close of the century as industrial development in Britain absorbed more and more labourers.

From 1901 to 1951 when so many other ethnical groups were entering the area, the British people continued to increase relatively as well as absolutely. In 1901, 74.9% of the people were British, and in 1941, 77.2% were British. But the three elements of British immigration contributed unequally to their continued growth.

	1901	1941	% increase
English	54,013	169,846	315%
Scots	21,826	59,504	273%
Irish	30,826	48,222	160%

From this table it can be seen that while English and Scottish immigrants have continued at a high level, Irish immigration has slowed down greatly.

There has been a notable drift of agricultural population from rural areas to the urban centres. Percentage figures show that there is still a trend towards urbanization of the total British population in the Peninsula.

	URBAN	RURAL
British 1901	69.4%	30.6%
British 1941	74. %	26. %

The four largest urban centres in the Niagara Peninsula--Hamilton, St. Catharines, Niagara Falls, and Welland--contain the largest proportion of the total British urban population and the largest part of the total British population in the Peninsula.

They are the sites where 59% of the total British people were living in 1951. There has been very little change in this figure in the last fifty years, as there were 62% of the British population living in these four cities in 1901. The real change has been in the concentration of British people into these four cities in relation to the smaller urban centres of the Peninsula. In 1901, the four main urban centres contained only 69% of the total British urban population in comparison to 83% in 1941.

In contrast to the Germans who are concentrated on the dip-slope plain, the British people are found predominantly on the scarp-foot plain. This is a reflection of the interests of the two groups--one mainly rural and agricultural, the other mainly urban and industrial.

In conclusion it can be said that the Peninsula has always been predominantly British in origin and will remain as such for years to come. The British, being urbanites in character, will remain close to the large urban centres. They have aided in the development of suburban districts

which characterize the Hamilton-Niagara Falls region.

GERMAN

Most of the German settlers arriving in the Peninsula before 1900 were agriculturalists. After 1900, they came as agriculturalists and industrial workers. The majority of the German population entered the Peninsula before the turn of the century. In the twentieth century, the two world wars caused great fluctuation and decreases in German immigration. After 1911, the German immigration into the Peninsula was relatively small because Germany herself was undergoing a change which was accompanied by a downward trend in emigration.

In 1901, the Germans were found in all townships in the Peninsula. In many areas they actually surpassed the British population such as in Bertie, Rainham, and Humberstone, townships. Except for Clinton township on the scarp-foot plain, the Germans were found mainly on the dip slope plain. This pattern has not changed very greatly in the last fifty years.

A notable feature of the German population in the Peninsula is its decrease in numbers and percentage of total population between 1901-1941. By 1951, the German population had dwindled by 40%. Only Hamilton remains stable as compared to the other sections of the Peninsula. The German population has decreased from 20% of the total population in 1901 to 5% in 1951.

The rural-urban distribution of the German population varies within the Peninsula. Of the Germans living west of the Welland Canal on the dip slope plain, 8% are rural dwellers. But the Iroquois plain is just the opposite as 75% of the

Germans live in urban centres. This is a great contrast to the German urban-rural distribution elsewhere, and should be connected to the specialization and industrialization of the scarp-foot plain. Except for the large German population in Hamilton, the Germans are one of the few remaining predominantly rural ethnic groups of the Peninsula.

FRENCH

The French people began to move into the Niagara Peninsula about 1800, just when the United Empire Loyalists were arriving. The French immigrants were fur traders and lumbermen, so they moved into the interior of the Peninsula while the Loyalists sought, for agricultural purposes, the partially cut-over land surrounding the forested interior. By 1901, the French composed just over 1% of the total population of the Peninsula. There was no great concentration of them anywhere, as they were scattered throughout the Peninsula.

The French people in the Peninsula faced a problem of readjustment between 1890-1920. By 1890, the area had become almost deforested, causing sawmills to close down, and therefore the lumbermen had to move to other locations. Similarly, as the forests were removed, there was a corresponding decline in the number of fur-bearing animals, so the fur trappers also had to move to less populated areas. The exodus of Frenchmen from rural areas added to the rural depopulation picture around the turn of the century. The French element which remained after lumbering and fur-trading died out, were those who were employed in urban centres. Once they had adjusted themselves to the new economy and urban growth, their

numbers stabilized and during World War I they started to increase. By 1941, they composed 3.2% of the total population. This increase was due to immigration as well as natural increase. An amazing period of growth for the French group occurred in the census period of 1941-1951. During this decade the French doubled their previous population total of 11,350 to almost 23,000 people. This increase has helped to make the French group a more significant ethnic group in the Peninsula. In 1951, the French people in the Peninsula numbered 4.6% of the total population.

Although the French are thought to be primarily rural in character, the opposite case is true in the Peninsula. 77% of the French people in the Peninsula now live in urban centres as compared to 63% in 1801.

The French ethnic group in the Peninsula is comprised largely of French Canadians from Quebec and Northern Ontario. France has been quite insignificant as a source of immigrants since 1900. The French people are well assimilated in this predominantly British area. They have not retained their cultural characteristics as have the peoples from south eastern Europe.

DUTCH

The Dutch immigrants to the Niagara Peninsula prior to 1900 were largely farmers. They have continued to be farmers since that time and have contributed a great deal to the agricultural development of the Peninsula. Outside of the scarp foot plain and the kamic areas of Thorold and Ancaster townships, the Dutch are few in number. Their distribution is very similar to that of the British people. But whereas the British people

have become concentrated in urban centres, the Dutch have remained primarily rural. In 1901, 57.5% of the Dutch people were living in rural areas. And in spite of the great urbanization process within the Peninsula, this figure has up to 1951 only dropped a few percentage points to 53%. It is not surprising therefore that the Canadian and Ontario governments are happy to receive Dutch immigrants.

The Dutch urban settlers are concentrated in Hamilton and St. Catharines. In 1941, over one-quarter of the Dutch living in the Peninsula were found in these two urban centres. This total comprised 58% of the Dutch urban population. Another 12% are located in the cities of Niagara Falls and Welland, while the remaining 30% are scattered across the Peninsula in various towns like Fort Erie, Grimsby, and Port Colbourne.

The Dutch population in the Niagara Peninsula seems to be stabilizing itself around 3% of the total population of the Niagara Peninsula. Holland, like France, has now become rather insignificant as sources of migrants; in fact, both these countries, far from being sources of emigration, have become net recipients of migrants from the rest of Europe. The Dutch, especially in the rural areas of the Peninsula, have a favourable birthrate which maintains their numbers.

J E W S

This is a relatively insignificant ethnic group or religious group as far as numerical importance is concerned as they totalled .009% of the Peninsula's population in 1951. In fact, there has been a decrease of the Jewish population in the last few years: 1941 - 3618: 1951 - 3303.

This group, however, forms a valuable part of the economy of the Peninsula. Most of the Jews have large investments and available capital which has aided building activity, manufacturing, retail firms, and business activity as a whole since their coming into the Peninsula.

There has been a tremendous tendency for Jews to congregate in urban centres. In the Niagara Peninsula, 72% of the Jewish people are found in Hamilton, while another 12% are found in St. Catharines.

One of the reasons for the low and decreasing number of Jews is their low birth rate, far below that of the British people. During the depression years of 1930-39, the Jews restricted their family size to an even greater extent than the other people. Unless there is a substantial rise in the birth rate, or else a considerable immigration, the population and number of the Jews in the Peninsula will continue to decline.

Most of the Jews came to Canada from Europe during the period 1900-1925. There has been very little Jewish immigration since that time.

ITALIANS

Italian ethnic group was not represented in the Peninsula until near the end of the first decade of the twentieth century. From 1905 to 1955, there has been a pronounced upward trend of their numbers and their proportion to the total population of the Peninsula. The Italian population grew slowly but steadily with the greatest increases

taking place between 1911-1921 and again between 1941-1951. To-day the Italian group forms 4% of the Peninsula's total population.

An interesting feature of the Italian people is their distribution. Over 86% of the Italians live in cities or towns. This is typical of Italian immigration. It issues from an agricultural country, but when it enters new countries, it seeks industrial employment. In 1911, over 75% of the Italians were living in the four chief cities of the Peninsula. In 1951, however, the concentration of Italians in the four urban centres is not quite so pronounced, as only 65% now reside in the four cities.

The remaining 35% of the Italians are found in the towns of the Peninsula such as Hagersville, Caledonia, and Dunnville. Very few of the Italians are farmers.

Poles and Czechoslavakians

It is quite clear that in a country like Italy with an increasing population employed chiefly in agriculture, the supply of labour is likely to exceed the demand. Therefore, emigrants will move towards countries in which industrial development is taking place. On the other hand, in a country with an increasing population and a high level of industrial development, emigration will tend to fall off as in the case of Germany. Between these two examples come Poland and Czechoslavakia. They have a higher ratio of population to economic opportunity. They have not been able to maintain their population on a certain standard of living. Both have

been trying to solve the population problem by emigration to such areas as the Niagara Peninsula.

By 1911, there were just a handful of Poles, and practically no Czechs in the Peninsula. The few Poles that were present in this year were found in urban centres like Hamilton and the numerous towns near the Welland Canal. A decade later, the Poles numbered 3,000 in the Peninsula. In common with most twentieth century immigrants, they avoided the Haldimand County region or what might be considered the general farming area of the Peninsula. The many industrial towns attracted most of these new immigrants.

By 1931, the Poles were still increasing gradually and the Czechs started to arrive in the Peninsula. By 1941, there were over 10,000 Poles, and almost 3000 Czechs. But there was a slight difference between these two groups. The Poles are very similar to the Italians, as over 84% of the Poles dwell in urban centres. The Czechs do not exhibit the same urban trend, as many of them have moved to the rural areas surrounding the urban centres.

The 1951 census figures show that the Poles make up 3.2%, and the Czechs 1.6% of the total population of the Niagara Peninsula.

REMAINDER

The Austrians, Hungarians, Ukraines, Russians, and Romanians comprise the remaining ethnic groups. Similar to the other south and east Europe peoples, they have increased greatly in numbers and in proportion to the total population.

In 1901, there was less than 1% of the population from these countries. By 1951, they comprised over 6%. All these countries, but in particular Hungary and the Ukraine, contributed to the rise of south-eastern Europe to pre-eminence among sources of immigrants.

In the Niagara Peninsula, immigration has tended less and less to spread people over the interior sections. Despite continuous efforts to stimulate rural rather than urban settlement, the new Canadians continue to flow into urban centres, and this tendency has continued to grow. These ethnic groups are no exception to this rule. In the case of Hungarians, Russians, and Romanians, 70% of the population is urban. Austrians and Ukrainians tend to be more rural in character; 41% of the latter live in rural areas.

Like most of the other non-English and German peoples, these immigrants avoid the large general farming area of the dip slope plain. Over 57% of this group is concentrated in the four main urban centres. Hamilton has the largest proportion of all these peoples living within her limits.

The south-eastern European groups have never been popular as immigrants primarily because they cluster to cities and rarely become farmers or primary producers. This is seen in their concentration in the large cities and their rural distribution close to the urban centres. These immigrants are more difficult to assimilate than the north-western Europe peoples. But the second generation--those born in the

Peninsula of immigrant parents--they are quickly assimilated.

In recent decades therefore, the main flow of immigration is from south-eastern Europe. If this trend is permanent, the south-eastern European immigrants will tend to modify the racial composition and cultural characteristics of the Peninsula's people.

CONCLUSION

The Niagara Peninsula has a role as a geographical crossroads due to its build and setting. When the strategic position of the whole Peninsula was recognized, and hydro-electricity developed, the area became the site of great international activity and industrialization. The migration of people to such a favourable location was aided by the road, rail, and water connections leading to the Peninsula, as well as the transportation network within the area. At every stage of its growth, therefore, the population of the Niagara Peninsula has had to respond to external pressures which have been made more acute because of the close contacts with U.S.A.

The density and distribution of population, while reflecting the interests of the wider setting, shows to a greater degree the influence of pressures within the Niagara Peninsula. The build, the climate, soils, vegetation, drainage, and relief have reacted on the human history of the area to produce a series of changes. Thus we see the increased population at routeway nodes, along the scarp-foot plain, and in industrial zones like Welland. The distribution of population elsewhere, particularly the interior vale, reflects the poorer geographical opportunities offered by the environment.

The actual distribution of population can be divided into two classifications: urban and rural areas. The population of the urban areas has grown over 4 times its 1901 total while the rural population has increased only 2 times. The rural population is now characterized by a rapid growth of rural

non-farming population and a decline in the farm population. Since 1901 the farming population has been cut almost in half. Yet they are able to support the growing population of the Peninsula because of mechanization of agricultural land. The urban areas are characterized by a continued aggregation of population in cities and towns. There has been an extraordinarily rapid growth of suburbs and urban fringes around the small as well as around the larger centres. Looking at the Peninsula as a whole, the population has continued to increase steadily since 1901 forming one of the densest populated sections of Canada.

There has been a rapid increase of south-eastern Europeans into the Peninsula in the last three decades. The British people still outnumber the other ethnic groups but not nearly as much as in earlier periods. The increased diversity of people of mixed origins has given a greater variety in political, economical, and social elements of the Peninsula.

The Niagara Peninsula as a region is characterized by an increasing population which finds outlets in the increasingly intensified and commercialized agriculture, and in a more highly specialized industry.

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