YARMOUTH TOWNSHIP
A STUDY IN LAND UTILIZATION

A THESIS

BY

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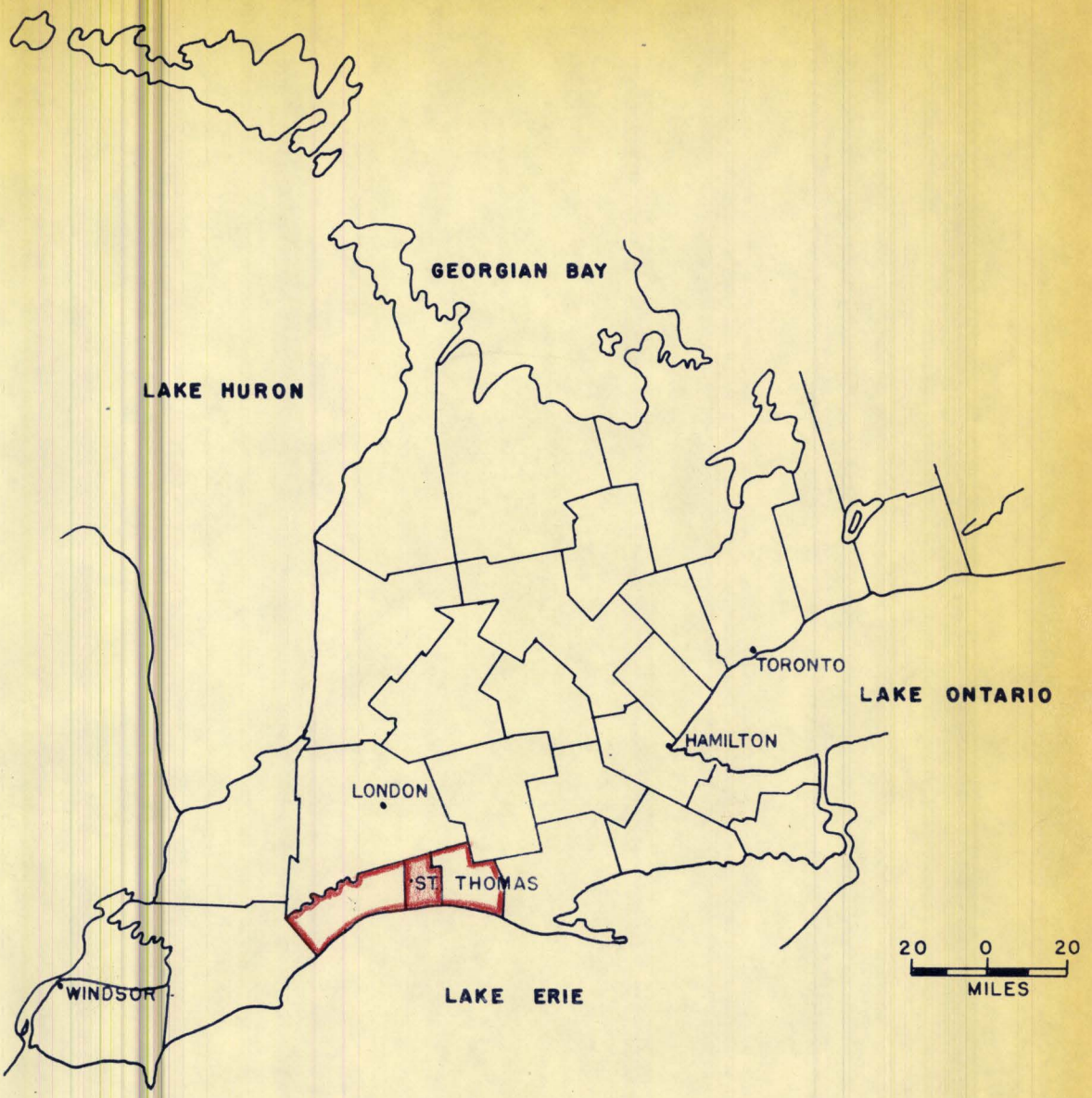
Yarmouth



LOCATION OF YARMOUTH

TOWNSHIP IN ELGIN COUNTY

IN SOUTH WESTERN ONTARIO

CHAPTER I

INTRODUCTION

Yarmouth township is located in the south of Elgin county in south-western Ontario (See location map), and is bounded by Malahide and Southwold townships to the east and west respectively, Middlesex county to the north, and Lake Erie to the south. Yarmouth is roughly rectangular and measures fifteen miles from north to south at its maximum extent and nine miles in width. Its area is approximately 104 square miles or 66,560 acres. The township is divided into 14 concessions which are crossed at right angles by five sideroads. The concessions are parallel to the Lake Erie shoreline because the original survey used this feature as a line of reference in establishing the original road plan.

Yarmouth township rises from 575 feet at the shore of Lake Erie to 825 feet at its northern boundary. Its surface is covered mainly with glacial deposits moulded into specific forms such as moraines, till plains, etc. The moraines trend roughly east-west and are surrounded by lower flatter topography consisting of a till plain to the north, a lacustrine plain in the central regions and a sand plain to the south.

The location of Yarmouth township has a significant bearing on its land use because the climate of the most

southerly portion is affected by the moderating influences of Lake Erie and the northern half of the township is in proximity to St. Thomas and London which provide large urban markets for such farm commodities as dairy products.

Scattered throughout the township are a number of small settlements, mainly at major cross roads although some are at railway depots and others upon the banks of one of the tributaries of the two major creeks. These hamlets maintain a very limited service function having been overshadowed to a great extent by the major cities in the area especially now that the automobile has made it exceedingly easy to travel to these places in a short space of time. Nevertheless the original settlers appear to have been guided in the building of their settlements by the character of the physical terrain such as the presence of a major travel artery in one place because of the flatness of the land or perhaps because a stream afforded an excellent site for creating a dam, etc. In turn the agricultural land use is also affected by physical determinates such as topography, inherent fertility of the soil, climate and so on. Therefore the purpose of this thesis will be an attempt to unearth the physical basis for land utilization although the human factor including economic conditions will be given due emphasis.

GEOLOGIC HISTORY

By the end of the Precambrian era the area of the township of Yarmouth was part of the Michigan basin.[1] Although much of the Canadian shield was a peneplain even at this early date, other parts had been subjected to pressures that caused broad warping of the dense crystalline surface rock. The Michigan basin was a product of these pressures. Ancient seas then began a long sequence of invasions and retreats across much of the North American continent. With each advance of the seas the basin received sediments which gradually became compressed and consolidated to form rocks.

By the end of the Palaeozoic era most of the North American continent had made its final emergence from the sea, and the product of approximately 200 million years of deposition was now exposed to the vagarities of the erosional processes. Because the sedimentary deposits were laid down in the Michigan basin they dip gently to the south west in the area of study. The most easterly edge of the sedimentary rock has provided a convenient line along which it may be attacked by erosional elements. This has created the Niagara escarpment and thus Southern Ontario is classified as cuesta and vale topography. The area which is now called Yarmouth township is situated to the west of the major escarpment created by differential

1. Caley, J.F. Palaeozoic Geology of the London Area, Ontario Ottawa, 1943. (Canada Department of Mines and Resources Memoir 237)

erosion of the Palaeozoic strata.

GEOLOGY

It is impossible to directly determine the nature of the bedrock of Yarmouth township because it is mantled by deep glacial drift, and there are no outcrops. But borings from test wells indicate that the uppermost beds are Norfolk limestone dating from the Devonian period and that these beds are almost horizontal with a slight south-westerly dip.[1] In many surrounding areas porous limestone is capped with younger impervious shale. Where this occurs then the possibility for discovery of oil is high. It is highly likely that neither oil nor natural gas have been discovered in Yarmouth township because of the lack of this capping material.

Although the bedrock is buried very deeply by drift it has played an important role in determining the nature of the surface deposits. The gravel of beach, delta, and Kame deposits are composed almost entirely of Norfolk limestone. The occurence of igneous material is extremely rare and where it is encountered it is about one foot in diameter.

PLEISTOCENE GLACIATION

The physiography of North American indicates that there have been four distinct glacial ages within the

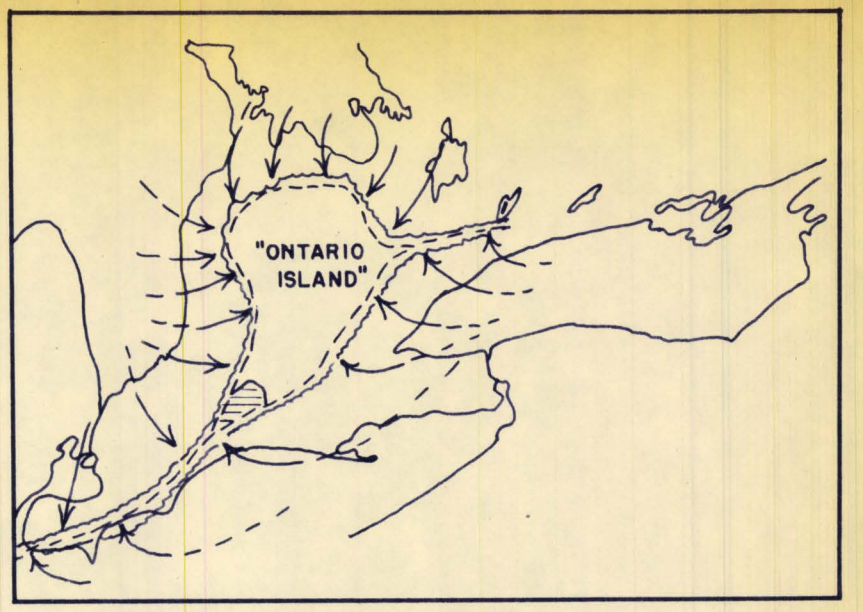
1. Caley, J.F. Palaeozoic Geology of the London Area, Ontario Ottawa, 1943. (Canada Department of Mines and Resources Memoir 237)

pleistocene epoch. Each stage produced its own distinctive features and it is from this evidence that the ice movements of prehistoric times have been reconstructed. However, each succeeding age obliterated part of the record of the preceding age, and only the glacial topography of the last, the Wisconsin, is fairly completely preserved. Because they are so young when considered in the light of the geologic time scale, they remain in excellent condition. This youthful condition has allowed many more details to be deciphered concerning the movements of the Wisconsin ice lobe than of any preceeding glacial substage. The series of diagrams in Figure 1 outline these movements and indicate their effects upon the study area.

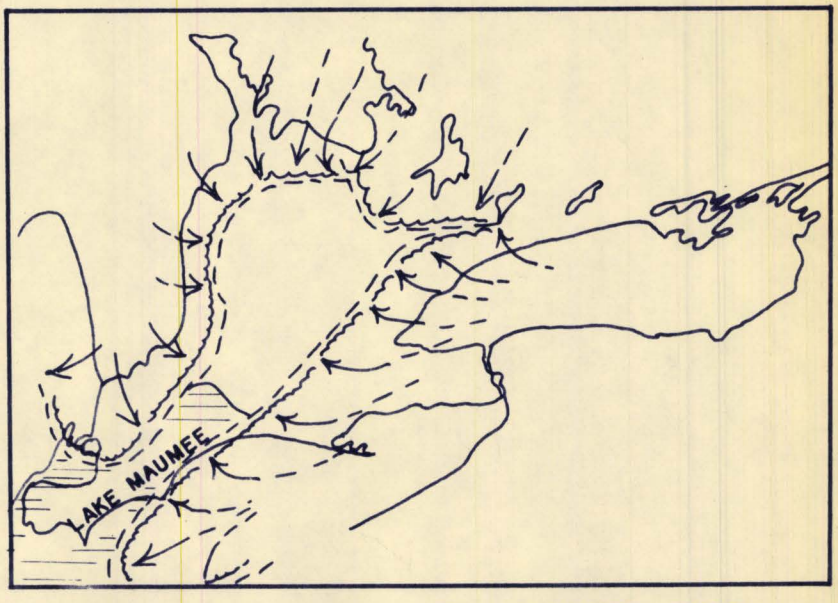
The continental ice mass was first split across the highest part of central Ontario known as Ontario island. It then retreated in a series of erratic oscillations to northern Ontario and the various Great Lakes basins. Often when the ice readvanced a short distance it created a terminal moraine from the glacial till which had recently emerged from beneath the ice or from glacio-fluvial material. This movement has created roughly concentric rings of terminal moraines around the higher portion of Ontario referred to as Ontario island. Figure 1 (a) from Chapman and Putnam[1] illustrates the initial retreat of the ice lobes

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

Fig. 1



A. EARLY LAKE MAUMEE STAGE



B. ST. THOMAS MORAINE - LATE LAKE MAUMEE STAGE

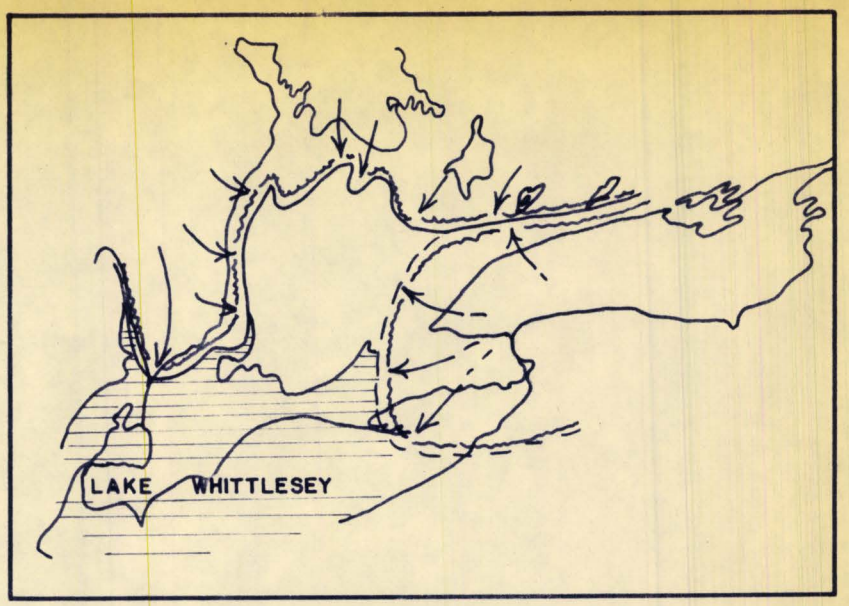
LEGEND

WATER

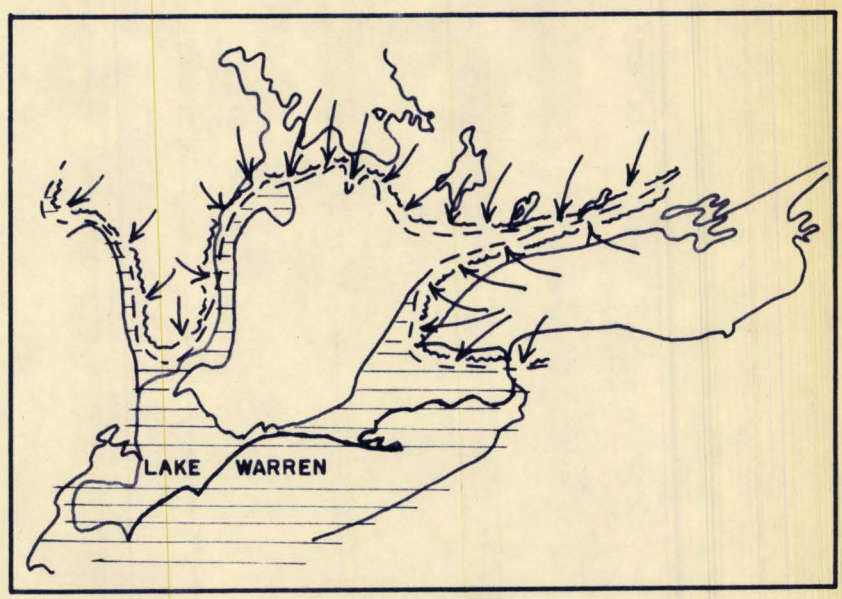
RETREATING ICE FRONT

(After Chapman and Putnam)

Fig. 1



C. GLACIAL LAKE WHITTLESEY STAGE



D. GLACIAL LAKE WARREN STAGE

LEGEND

WATER

RETREATING ICE FRONT

(After Chapman and Putnam)

back to their pressure centres in the vicinity of Lake Huron and lakes Erie and Ontario. A series of advances and retreats then constructed the first system of moraines and other glacial land forms. Figure 1 (b) depicts the ice lobe at the St. Thomas moraine and late Lake Maumee stage. The Tillsonburg moraine was formed by a readvance of the ice lobe into the waters of the very late Lake Maumee stage. The last two stages of the ice retreat that have any relevance to the glacial history of Yarmouth township are shown by Figures 1 (c) and 1 (d). They show respectively the possible extent of the two glacial lakes Whittlesey and Warren. With the aid of Map 2 it offers additional evidence of these larger ice movements and their effect on the much smaller area of Yarmouth township.

PHYSIOGRAPHY

One of the local pressure centres for the Erie-Ontario ice lobe was in the Lake Ontario basin. Because the ice movements were vigorous and the sedimentary rocks soft enough to erode easily, large amounts of glacial till were laid down in the study area. At the present Lake Erie shoreline these deposits are approximately 210 feet thick. This material increases to about 340 feet at the Tillsonburg moraine and decreases northwards to about 250 feet at the northern boundary of the township.[1] In terms

1. Stauffer, Clinton R. The Devonian of Southwestern Ontario Ottawa, 1915. (Canada Department of Mines)

of elevation the maximum height above sea level occurs in the area of the thickest glacial deposits. Elevation is 875 feet on the highest point of the Tillsonburg moraine. The lowest elevation is the surface of Lake Erie at 575 feet. The glacial deposits have been molded to form four main physiographic divisions in Yarmouth with a number of lesser features such as spillways and sandbars.

The first division, occurring in the north, is a small gently rolling area of fluted till plain. In some areas it is difficult to ascertain the nature of the original surface because parts are dissected by the upper tributaries of Kettle Creek. The local relief for this area is 50 feet. The glacial deposits occur as stone free heavy clays that are sticky when wet and form the parent material for the imperfectly drained Conover clay loam.

The Tillsonburg, Norwich and St. Thomas moraines comprise the next division. Although the surface of the moraines is far from smooth it lacks the nummocky nature usually attributable to subaerial deposition. It is concluded therefore that when the moraines were formed the ice lobe was under the waters of one of the glacial lakes, probably Whittlesey. The strongly rolling surface of the moraines has limited the type of land use to a marked degree. In many places the sides of the moraines were steeper by the development of shore bluffs by wave action in Lake Whittlesey. Because internal drainage is good in the stone-free glacial till, dissection by erosion has not been a

LAKE ERIE

PHYSIOGRAPHY OF YARMOUTH TOWNSHIP

SCALE 1 INCH TO 1 MILE

- TILL MORAINE
- SPILLWAY
- TILL PLAIN
- SAND PLAIN
- LACUSTRINE PLAIN
- IMPERFECTLY DRAINED SAND OVER CLAY PLAIN
- SANDBAR
- SHORELINE

- O QUARRY
- S SPILLWAY DEPOSIT
- K KAME DEPOSIT
- B BEACH DEPOSIT
- D DELTA DEPOSIT
- TWP. BOUNDARY
- DRAINAGE LINES

problem. One branch of Catfish creek runs between the two lobes of the St. Thomas moraine and intermittent creeks run in the trough south of the Tillsonburg moraine and in the spillway between the two lobes of the same moraine. (The relative relief is 125 feet with the highest point of 850 feet occuring on the St. Thomas moraine and 875 feet on the south-eastern end of the Tillsonburg moraine.) Kame deposits are the only ice contact features other than the moraines. They occur only on the Tillsonburg moraine and predominate in the most southerly lobe. Illustration 1 shows one of these kame deposits which is being quarried for road building material. Map 3 shows the distribution of gravels within the township and it may been seen that almost the entire western half of the southern lobe of the Tillsonburg moraine is underlain by kame deposits. Gravels to the north of the township are associated with shoreline development in early Lake Maumee.

The third major subdivision is a broad, strikingly flat lacustrine clay plain in the central section of the township. The clays most certainly were deposited in an arm of Lake Whittlesey which was sheltered by the Tillsonburg moraine from the prevailing south-westerly winds and are therefore heavy textured. Internal drainage is imperfect and this has lead to increased surface runoff. The surface waters have been channelled into small round gullies and headward eroding channels of the upper tributaries of both Kettle and Catfish creeks. This erosion

BELMONT

MAPLETON

KINGSMILL

ORWELL

YARMOUTH CENTRE

ST. THOMAS

JAFFA

UNION

SPARTA

DEXTER

PORT STANLEY

CONCESSION 14 13 12 11 10 9 8 7 6 5 4 3 2 1

LOTS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

Map 3

MAP SHOWING LOTS CONCESSIONS URBAN CENTRES AND GRAVEL DEPOSITS (after DHO)

SCALE 1 INCH TO 1 MILE

ST. THOMAS

URBAN CENTRE

GRAVEL DEPOSIT

ROADS

has led to intensive dissection of both the extreme east and west of the clay plain, with a resultant increase in the local relief from 50 to 75 feet. The plain has an elevation of about 775 feet.

The sand plain in the southernmost part of Yarmouth comprises the last major physiographic division. It is comprised of fine-textured light-coloured sand in both its extreme western and south-eastern portions. Towards the centre of the plain the sand becomes increasingly heavier with a larger proportion of clay because of a ridge which comes closer to the surface eventually grading into an imperfectly drained clay plain. The surface of the area varies from strongly rolling relief with many steep v-shaped gullies in the areas of dissection by surface runoff, to a broad flat plain in the central portion and in the vicinity of the shoreline of Lake Erie. The total local relief varies from 100 feet in the dissected areas to 50 feet on the flatter plains. The actual elevation on the plain is 750 feet at the southern base of the Tillsonburg moraine and 700 feet at the top of the Lake Erie shore-bluffs. The soils developed upon the sand plain are invariably of a sandy texture, but they vary in how well they are drained.

The lesser features in Yarmouth Township include the aforementioned flat poorly drained clay over sand plain in a shallow hollow with a covering of a few inches of sandy loam over much of the surface which is forested in many places. Two major spillways are connected with the

Tillsonburg moraine. One is linked directly with a large east-west trending trough located immediately south of the Tillsonburg moraine, and the other occurs between the two lobes of the moraine. Both appear as broad flat shallow poorly drained valleys. Both appear to have drained into a precurser of the present Kettle Creek.

A large sand bar running from west to east and approximately 25 feet high is the last major land form of note. It was formed in Lake Warren by long shore currents reworking deltaic material deposited by the precurser of Kettle Creek. The southern slope displays a discontinuity in gradient with an abrupt break at the base where contact is made with the surrounding sand plain. The sand bar loses its unmistakable form to the west gradually decreasing in elevation to become part of the sand plain. To the north it dips gently and forms part of the south slope of the trough in front of the Tillsonburg moraine. Because the trees have been removed from this area the bar has become almost unusable. The steep southern slope is completely devoid of vegetation and is being actively eroded by wind and surface runoff. The sand does not appear to be stratified anywhere along this open side but rather is a homogeneous mass of uniformly sized grains.

THE WITHDRAWAL OF WISCONSIN ICE FROM YARMOUTH TOWNSHIP

The first retreat of the Erie Ontario ice lobe would have taken the ice back to the initial pressure centre, the

Illus. 1 Kame deposits in the Tillsonburg moraine just north of the hamlet of Sparta.

Illus. 2 Spillway between north and south lobes of the Tillsonburg moraine.

Illus. 3 Along the crest of the St. Thomas moraine at Highway 64.

Illus. 4 Looking south into the Urstromtaller (trough) running east-west along the front of the Tillsonburg moraine.

Lake Erie basin. During the second thrust the ice became loaded with lacustrine clays which had settled into the basin in the period between advances of the ice. This material and perhaps some sedimentary rock plucked from the land mass was deposited upon the Norfolk limestone and over any pre-existing glacial feature, as far north as the ice lobe travelled before coalescing with the lobe pushing south from the Lake Huron basin. As a result the initial till plain was formed as a sort of slate upon which later movements of the ice would be recorded. The till is very fine and relatively stone free because of its lacustrine origin. The shoreline (map 2) situated on the till plain in the extreme north of Yarmouth township is a remnant of the shoreline developed by glacial Lake Maumee. With further retreat of the ice the northern third of the study area was exposed. Then the ice readvanced again to form a terminal moraine. There are two possible directions from which the ice could have advanced; from the south-east as a narrow lobe pushing overland across central Yarmouth or from the south across the southern part of the township. If the ice had readvanced from the south-east then it would have formed the St. Thomas and Tillsonburg moraines at the same time, producing the two strands in each moraine by making two major thrusts. In each case the centre of the moraine would have been breached by the dammed melt waters and the separation between the two moraine systems created. The melt waters would have quickly eroded the morainic

dams both times leaving no time for the development of shorelines at this time.

As a second explanation it is suggested that the moraines were constructed by four minor readvances of an ice lobe pushing north out of the Lake Erie basin. The latter suggestion appears more feasible for a number of reasons. First although the major pressure centre for the ice was to the south-east of the township it is not likely that the St. Thomas and Tillsonburg are one and the same moraine system because this would have meant that a very narrow lobe of ice would have had to push across south-western Ontario entirely on land not in the lake basin. At the same time the ice would have had to build the St. Thomas moraine on its northern flank and the Tillsonburg moraine on its southern flank. It seems inconceivable that such a narrow lobe of ice would have been capable of such a large amount of work. Secondly, there is a major spill-way occupying the lowland between the two lobes of the Tillsonburg moraine. The gradient of the floor of this spillway indicates that the water flowed in a north-westerly direction. Only a melting lobe of ice standing immediately south of the moraine would produce water in sufficient quantity to breach the central portion and flow between the strands laying spillway deposits indicated on maps 2 and 3. Thirdly there is a trough or Urstromtaler running east-west immediately south of the Tillsonburg moraine which gives every indication of having been the route taken by the melt

waters of the ice lobe as it paused a short distance south of the most southerly lobe of the moraine. Presently there are intermittent creeks flowing in the base of this trough. They do not appear to have made any great inroads in its central portions but the eastern and western extremities have been eroded. All of this evidence appears to point to the second hypothesis as the correct one.

After the ice had retreated for the last time to the eastern Lake Erie and Lake Ontario basins the water level rose due to the melting of the high dome of ice. The Tillsonburg moraine became an island in Lake Whittlesey and shoreline development began. Because the moraines were not protected by vegetation they were very susceptible to erosion and the waters of Lake Whittlesey became extremely muddy. An inkling of their condition may be gained from the present Lake Erie waters in the vicinity of clay promontories. This clay settled in quiet water north of the moraine island. Because the winds are predominately from the west and south-west, it is conceivable that they were in the past, therefore shoreline development occured to the south of the moraines between the present levels of 775 to 785 feet. No shorelines were found to the north of the moraines because although the fetch from the northern side of the Tillsonburg moraine to the southern sides of the St. Thomas and Norwich moraines was great enough to allow the north-easterly winds to generate waves large enough to develop beaches, they did not occur often enough to do so.

In some places there were no shore deposits because of the paucity of beach building materials in the original glacial debris. Thus some of the present shore features are shore bluffs cut into the moraines. In other places gravel and sand beaches were created by washing away the finer clays and leaving the rounded stone and by reworking such ice contact features as kame terraces. As the water levels continued to drop the shorelines shifted southwards and at one level the edge of the water was located at the present level of the sand bar shown on the physiographic map (Map 2). The waters of a forerunner of Kettle Creek debouched into what was probably glacial Lake Warren and built up delta deposits of fine sand in the south-western section of the township. This material was reworked by the lake currents and waves to form the sand bar to the east. Later as the lake level dropped slightly a bluff was cut into the southern side of the bar at the present level of approximately 735 feet. At the same time melt waters from much further north-east in Southern Ontario were quite likely flowing in the spillways between the lobes of the St. Thomas and Norwich moraines. These waters flooded through a low point in the Tillsonburg moraine and created the forerunner of the present Catfish Creek.

Concurrently the melt waters formed a sandy delta in Lake Warren in the vicinity of Jaffa. These sandy deposits mantled on old gravel delta (Illus. 5) formed by an earlier stream flowing before the last sequence of advance and re-

treat of the ice lobe took place across southern Ontario.

The waters of Lake Warren continued to recede to form a series of later proglacial lakes ending with the present lake Erie.

SHORELINES

Figures 1 (a), 1 (c) and 1 (d) show the development of the proglacial lakes Maumee, Whittlesey and Warren. There were more glacial lakes but these three have special relevance to the area of study because shorelines attributable to wave activity in these bodies of water are found in Yarmouth township and have been plotted on map 2. Hough[1] suggests that the maumee stage of the Lake Erie basin stood at an elevation of 760 feet to 800 feet, the Whittlesey at 738 and the Warren from 675 to 690 feet. However, Chapman and Putnam suggest three levels of not more than 900 feet, from 800 to 780 feet, and from 740 feet to 720 feet for lakes Maumee, Whittlesey and Warren respectively. The values offered by Chapman and Putnam appear to be more meaningful for the present study for a number of reasons. Hough's figures were computed in and for the southern shore of Lake Erie, and would not therefore be affected to as great an extent by isostatic rebound. The major pressure centres for the ice masses had a more northerly location. Thus the values for rebound of the earth's crust would be greater north of the lake. Also although one figure is

1. Hough, Jack L. Geology of the Great Lakes. Urbana (Ill.) University of Illinois Press 1958, pg. 140.

Illus. 5 Gravel delta deposits showing topset, foreset, and bottomset beds located in Catfish Creek valley.

Illus. 6 Close-up showing gravel deposits which have been cemented by free carbonates in the water.

offered for the level of a specific glacial lake it cannot be more than a rough estimate because the rebound has not occurred as a single smooth movement of equal value along the entire length of the lake basin, but rather the rebound has been of greater magnitude to the north-east than the south-west. Because the actual value of the elevation above sea level is not a meaningful figure the best method of correlating portions of shorelines with one another would be to count the number of shorelines from highest to lowest and locate specific ones by this process. Chapman and Putnam have done this and therefore their suggested values will be accepted for Yarmouth township and will be the basis for identifying the shorelines in the present study. The evidence for the Whittlesey shoreline is wave cut bluffs in the sides of the St. Thomas and Tillsonburg moraines associated with deposits of stratified gravel and sand as Lake Whittlesey paused in its subsidence. In the instances where the beaches were laid on the St. Thomas and Norwich moraines there are also flat laid lacustrine clays to the south of the bluffs which were deposited in the deeper water offshore. The shoreline features in the Tillsonburg moraine are bordered by a deep trough and the water laid sediments are not so apparent because of strewn activity.

A beach deposit on the thirteenth concession on lots eight and nine is shown in illustration 7. It is composed of horizontally stratified bands of rounded water washed gravel and clear sand. Overlying the beach deposits is two

to three feet of Conover loam. The terrain dips gently to the north and the gravels become correspondingly coarse in that direction over a distance of about 300 feet. The gravel deposits, map 3, continue in a southerly direction across to the twelth concession at an elevation ranging from 825 to 800 feet. This old shoreline is probably part of late Lake Maumee which occupied the London basin.

Traces of Lake Whittlesey was found in a number of places. Illustration 8 shows layers of stratified clean fine sand at Kingsmill in a small gravel pit, located at the sharp break in gradient between a flat plain of lacustrine clay and a small shore bluff to the north. The shore bluff continues both to the west and east of the hamlet with an elevation of 785 feet at the top of the bluff. To the west it is eroded by upper tributaries of Catfish Creek and disappears south of Mapleton because it has been destroyed by headward erosion of the creek. The Whittlesey shore bluff occurs again on the southern side of the St. Thomas moraine both south and north of the Edgeware road on lots thirteen, fourteen, fifteen and sixteen. Drilling operations reveal that old gravel beach deposits occur on the gentle base of these bluffs. Steep shore bluffs located on the southern side of the Tillsonburg moraine are shown in illustration 9. No shore features are found on the northern side of either the St. Thomas or Tillsonburg moraines. The moraine displays the usual sharp break in gradient where wave action has attacked the flank. Two

quarries located at approximately the 775 foot contour are being worked and the gravels of the old shoreline are being removed. This area lacks much of the flat lacustrine sediments offshore because of the erosional activity of the creeks flowing in the trough immediately south of the shoreline. However the remaining sedimentary deposits in the trough have mantled some of the pre-existing features so that in some places the topography is gentle and smooth in appearance. The shoreline is not continuous across the whole southern extent of the moraine but is breached in two places by stream dissection.

The sandbar also displays other shoreline features. The southern face is steeply knicked by wave cutting and the sand plain immediately south of the shoreline is very flat although there appears to be no clays laid down, only flat-lying silty sand. It is suggested that the shoreline at the base of the bar at 750 feet is a feature of the early glacial lake Warren.

Forming the southern boundary of the township, the present lake Erie shoreline represents the final stage in the withdrawal of the ice lobes from the Great Lakes basins. Shore bluffs rise 125 feet above the lake but drop as low as 30 feet at Orchard Beach situated at the eastern end of Port Stanley. They are entirely absent at the valley of Kettle Creek.

The angles of slope of the bluffs are related to the various materials of which they are composed. Compacted

clay till maintains slopes of about 80° (see illus. 10), but the slopes composed of fine silty sand ranged from about 45° to 80° depending on their thickness. If the bed was more than three or four feet thick the slope decreases. The steepness is related to the presence of an overlying thick grass sod which helped to protect the layers of sand immediately beneath from the ravages of erosive forces. The sandy material erodes more quickly than the underlying till, as shown in illus. 10, and the basal portion of the sandy layer quickly erodes back to maintain the steep slope especially if the grass sod is present immediately above. As the layer of sand thickens then the slopes become more gentle because the base is mantled with weathered debris from the upper slope. The till deposits at the base of the shore bluff are also mantled in debris and are arranged in a more gradual gradient with a slope rarely more than 45°.

The depth of the sand at the top of the bluff varies with its east-west position in the township. It is thickest in both the east and west extremities of the study area and very thin west of Dexter. In many places the sand is stratified into layers of equal spacing in the thickest deposits, indicating that it has been laid down in standing water. This varying effect is not so evident in the thinner deposits. Rather it is semi-cemented by oxides leached from the surface vegetation. The thickness of the sand is directly related to land use on the bluff surface. Where it is thickest tobacco farming occurs, and where it is thinest the

soils become too heavy for tobacco and potatoes are grown. The silty sand deposits are affected by the aeolian erosional process of saltation which produces very intricately carved hollows in the face of the bluff. The south-west wind strikes the surface of the bluff and picks up grains of sand and then hurls them against the face of the bluff. These tiny grains then sweep to the top of the bluff to form very small dunes in the western end of the township. These dunes are not live but rather are covered with a grass sod which holds the grains from further movement. Often the edge of the bluff displays an undulating wave form best described by H.A. Wood as serrated.[1] The mechanism for creating this form is a feeble spring line at the junction of the sand and till in some cases, or in the silty sand itself in others. Erosion by mud flow causes portions of the upper bluff face to be undermined and eventually to slump creating the wave form along the outer edge of the cliff.

The heavier clay till displays varying degrees of density from place to place along the shore and in vertical position upon the surface of the shore cliff.[2] The most densely packed clay maintains a steep slope (illus. 11) and wastes by breaking off in large blocks which slide or roll down the slope under the influence of gravity. Frost

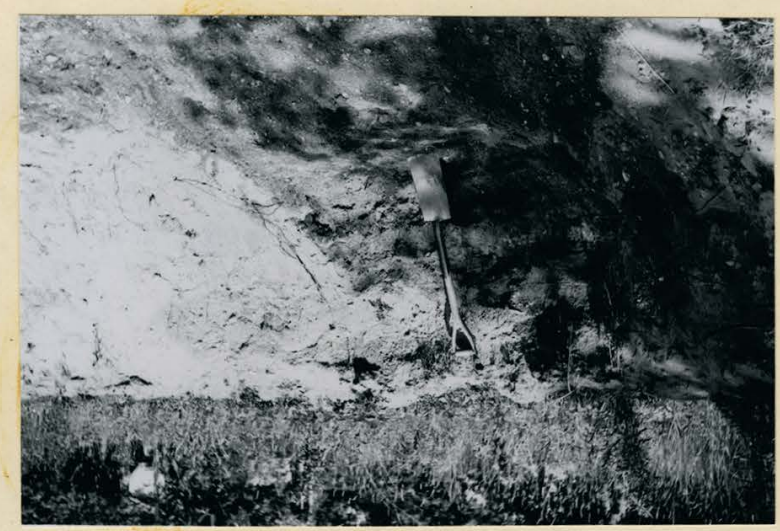
1. Wood, H.A. Erosion of the shore of Lake Erie, Chapter 3. (unpublished M.A. Thesis, McMaster University)
2. Ibid

shattering is the most likely mechanism for achieving this end. Less dense till, not as heavy in texture, is more subject to slumping. This material becomes saturated with ground water and its mass is increased so that it overcomes internal friction and the slumping movement takes place. Water also acts as a lubricant which reduces the cohesion of the till mass by lessening the static friction between the grains of till material. The slump blocks form promontories in the lake and are attacked by wave action. The water is characteristically grey coloured in the vicinity of the slump blocks because of the load of clay held in suspension. This material settles in the deeper water making the area very unpleasant for bathing.

The Erie beach line is approximately 575 feet in elevation and varies from a wide sandy beach at Port Stanley to wave eroded cliffs in the easterly and central reaches of Yarmouth. Because the winds are often south-westerly and the fetch from west to east is long in Lake Erie, beach materials are carried from west to east. The long cement piers protruding into the lake at Port Stanley intercept this material and arrest its eastward movement. Therefore the beach to the west of the piers is wide and composed of both quartz and limestone sands of fairly uniform size. This build-up of sandy material has also protected the bluffs, which are now about a quarter of a mile inland, from any further wave attack. The beach is roughly triangular with the base perpendicular to the piers and the apex

about one-half mile to the west where the shore bluffs, the source of the beach materials, are still being vigorously attacked by waves. The pier stops the further eastward movement of beach materials. Thus no major deposits are encountered for approximately one mile beyond the Port Stanley beach. Then small pockets of beach deposits occur to the windward of the clay slump block promontories. (Illus. 12). The mean erosion rate for the entire township is seven feet per year with the maximum rate immediately east of the piers at Port Stanley and none wherever shore deposits protect the base of the shore bluff from the eroding waves of Lake Erie. As the shore bluffs retreat there is concommitantly a loss of acreage on the top surface. It is unfortunate that this acreage comprises some of the best soil for agricultural purposes in the township. It is doubly unfortunate when it is realized that no attempt is being made to institute conservation procedures. Often this area is still growing clean tilled row crops when it falls over the edge of the bluff and into Lake Erie.

Illus. 7 Lake Maumee gravel beach located on the thirteenth concession.



Illus. 8 Lake Whittlesey gravel beach located at Kingsmill.

Illus. 9 Lake Whittlesey shore bluff cut into the southern slope of the Tillsonburg moraine.

Illus. 10 Lake Erie shore bluff with layer of fine sand overlying till.

Illus. 11 Block of till palling away from cliff face.

Illus. 12 Small gravel beach to windward of clay slumpblock.

CHAPTER II

CLIMATE

Recent Climate Data were collected from weather stations in St. Thomas and Port Stanley. The first station is maintained by the St. Thomas waterworks department and the second by a farmer within the village limits of Port Stanley. Figures for precipitation, maximum and minimum temperatures and the first and last day of frost were available and have been utilized in computing all values stated in this chapter.

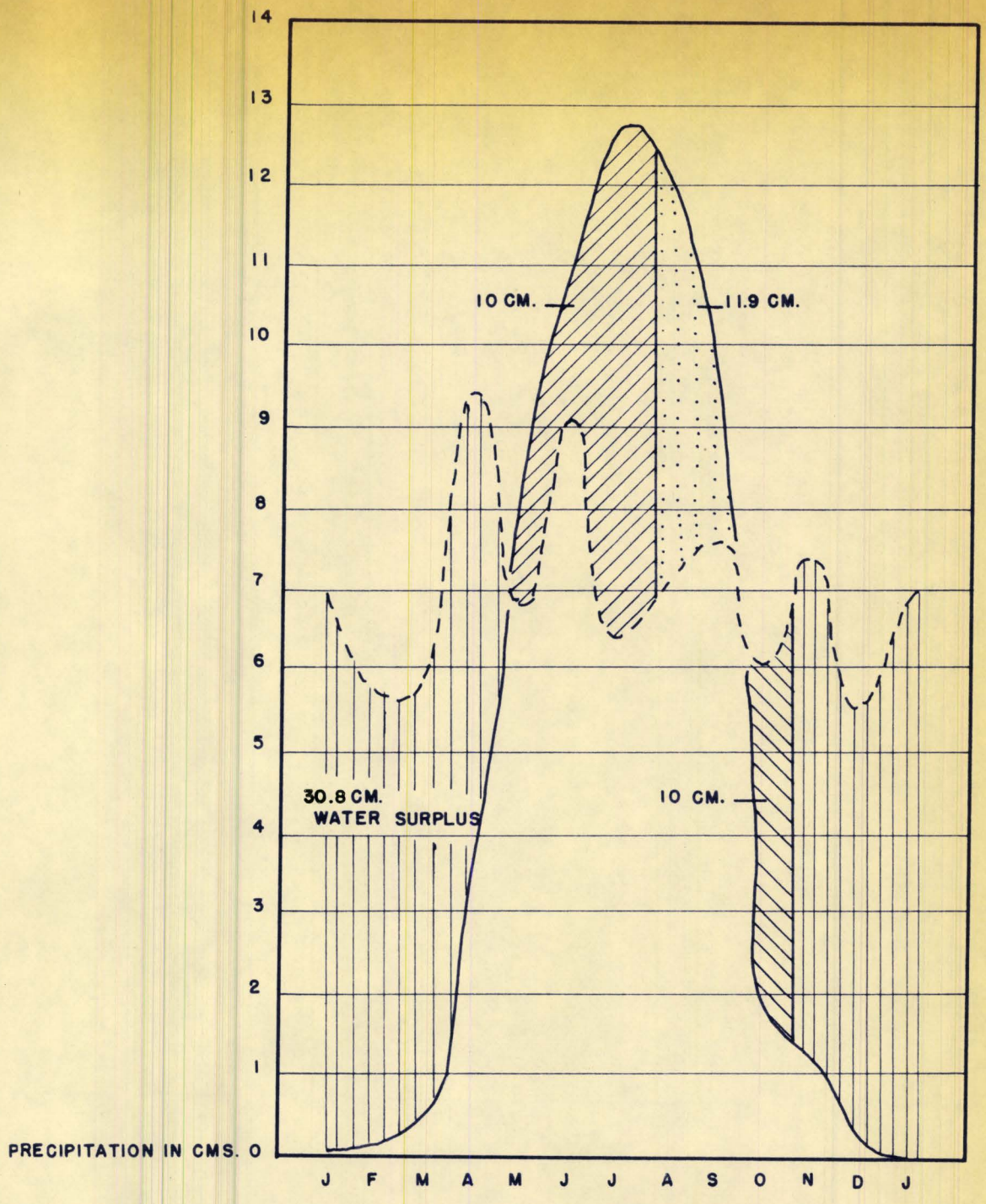
The agricultural use of the land is influenced mostly by climate and is therefore a valuable aid in explaining crop distributions. Although numbers are given for average weather conditions within the township they are often misleading because it is the extremes that often have the most pertinent effect upon the growth of plants. Also averages imply homogeneity over wide areas which do not in reality exist. For instance late frosts may occur in the township yet soft fruits are grown along the Fruit Ridge road, concession 4, because the orchards are located upon the flanks of the Tillsonburg moraine where air drainage is good. However, arithmetic means are an excellent device for summarizing a large mass of data and presenting it in a form which allows comparison with areas better known to the reader in order that a clearer mental picture of the climatic conditions of Yarmouth Township may be gained. As the study area is located roughly at 43° north latitude it is classi-

fied as possessing a temperate climate, but the distribution of land and water is an important factor also because Lake Erie lies immediately to the south where temperatures are modified by the presence of this large body of water giving a more marine-like climatic regime in its proximity. Spring temperatures are slightly lower and the autumn season is prolonged by almost a month at Port Stanley, whereas the spring and autumn temperatures rise and fall more quickly further inland at St. Thomas. Winds are predominately south-westerly which insures that the moderating influences of Lake Erie are carried a little way inland. Southern Ontario, lies within the belt of cyclonic storm activity and therefore the weather is variable with a moderate amount of precipitation occurring mostly as showers of short duration in summer and snow flurries in winter. Figures 2 and 3 show that precipitation is fairly constant in amount all year with perhaps a slight tendency towards a spring and early summer maximum in St. Thomas. The St. Thomas and Port Stanley mean annual precipitation is 35.0 and 33.4 inches, the three month winter mean temperature is 24.6°F and 23.3°F, the spring mean temperature is 42.1°F and 42.0°F, the summer mean temperature is 65.3°F and 66.6°F, and the autumn mean temperature is 49.6°F and 50.0°F. The discrepency of one Farenheit degree between the series of mean temperatures indicates that the lake keeps Port Stanley slightly cooler in summer than St. Thomas and slightly warmer in winter. The length of the frost free period was only computed by

the writer for St. Thomas and was found to average 139 days. Because of the generally warmer conditions prevailing along the Lake Erie shoreline it would be of slightly longer duration in Port Stanley. Although a temperature of 42°F is needed before plant growth commences the growing season in the study area it is considered to be longer than the frost free period because a hardy plant can take one or two light frosts with little damage. Therefore the growing season extends from mid April until the end of October, some 200 days.

Field studies show that the Thornthwaite climatic classification is a reliable tool for determining soil moisture deficiency in Canada.[1] Figures 2 and 3 indicate that there is a water deficiency in late summer at both stations. Because rainfall is lower and temperatures higher farther away from Lake Erie, there is a greater deficiency at St. Thomas than Port Stanley. Therefore 11.9 additional centimetres of water should be applied to areas supporting plants which experience their maximum growth during the late summer months at St. Thomas whereas only 9.7 centimetres are needed in the vicinity of Port Stanley. However these figures may not be entirely accurate because the graphs were computed utilizing the basic assumption that all of the soils of Yarmouth township will store ten centimetres of

1. Sanderson, Marie. The climate of Canada according to the new Thornthwaite classification. In Scientific Agriculture, Vol. 28, No. 11. Nov. 1948.



THORNTHWAITE WATER BUDGET FOR ST. THOMAS

POTENTIAL EVAPOTRANSPIRATION

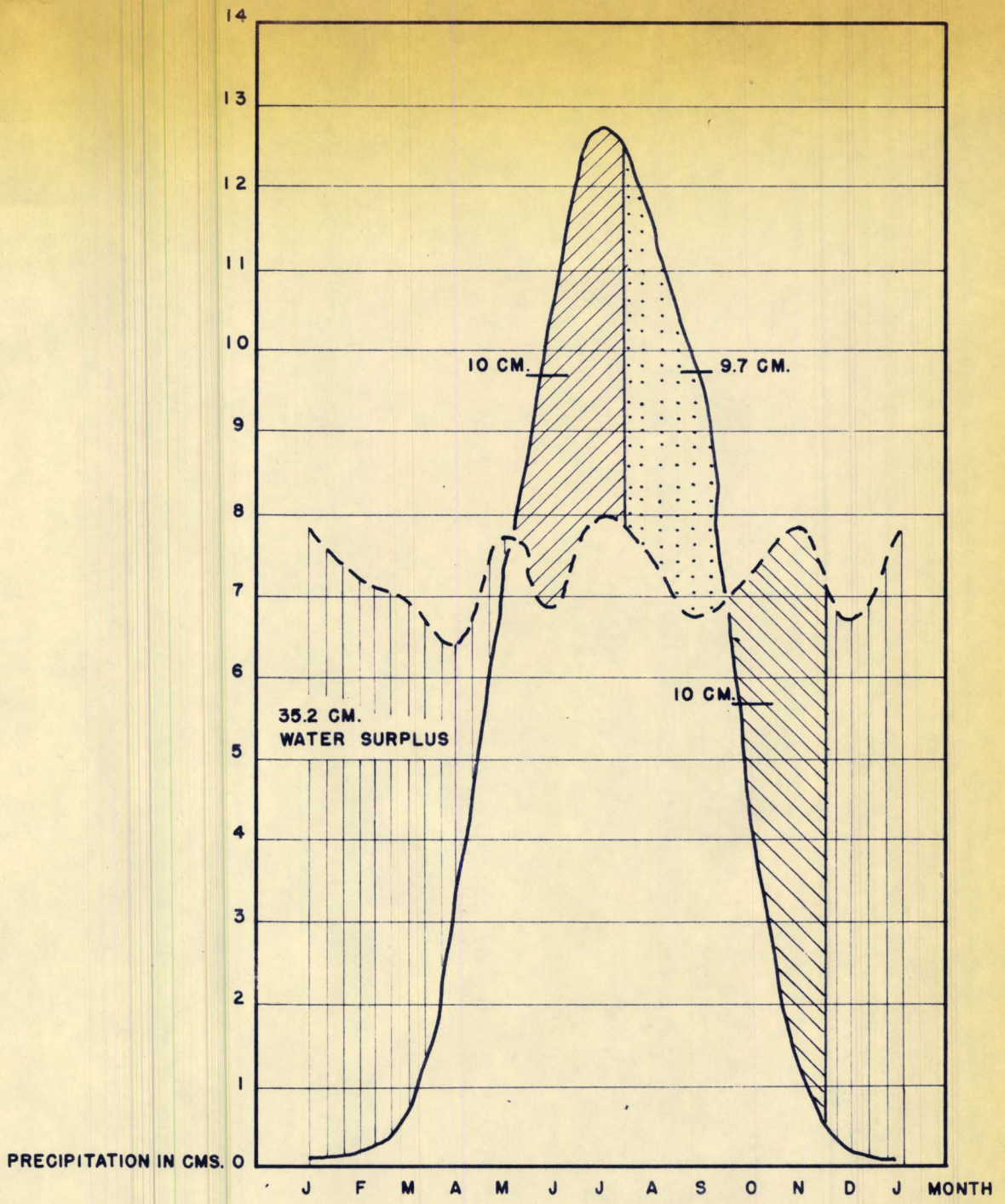
PRECIPITATION

WATER SURPLUS

SOIL MOISTURE UTILIZATION

WATER DEFICIENCY

SOIL MOISTURE RECHARGE



THORNTHWAITE WATER BUDGET FOR PORT STANLEY

POTENTIAL EVAPOTRANSPIRATION

PRECIPITATION

WATER SURPLUS

SOIL MOISTURE UTILIZATION

WATER DEFICIENCY

SOIL MOISTURE RECHARGE

ground water. The texture of the soil has some bearing on the ease with which water passes through the soil interstices on its way to the water table. Therefore the sandy loams in concession 1 would need more irrigation water than the graph indicates whereas heavy clay soils may need less.

DRAINAGE

Water from summer precipitation and winter snow is removed from the township by evaporation, transpiration and by both internal and surficial drainage. Wherever the soils are light and permeable internal drainage predominates over surficial and few major drainage lines develop such as upon the sand plain in the southern portions of the township. However the areas of till or lacustrine clay plains have developed a dense network of major drainage channels because they inhibit the percolation of water through the soil profile to the water-table, making water available for runoff. All surface drainage is handled by two major drainage systems, Catfish Creek in the east of the township and Kettle Creek to the west, and a number of very minor intermittent streams flowing in deep gullies in the first and second concessions. Each displays a dendritic drainage pattern in response to the fairly homogeneous composition of the glacial deposits. This pattern is disrupted by the moraine systems and the presence of the well drained sand plain to the south with its good internal drainage. The creeks are also classified as consequent because all of the glacial debris is easily eroded and there is likely no one area that favours

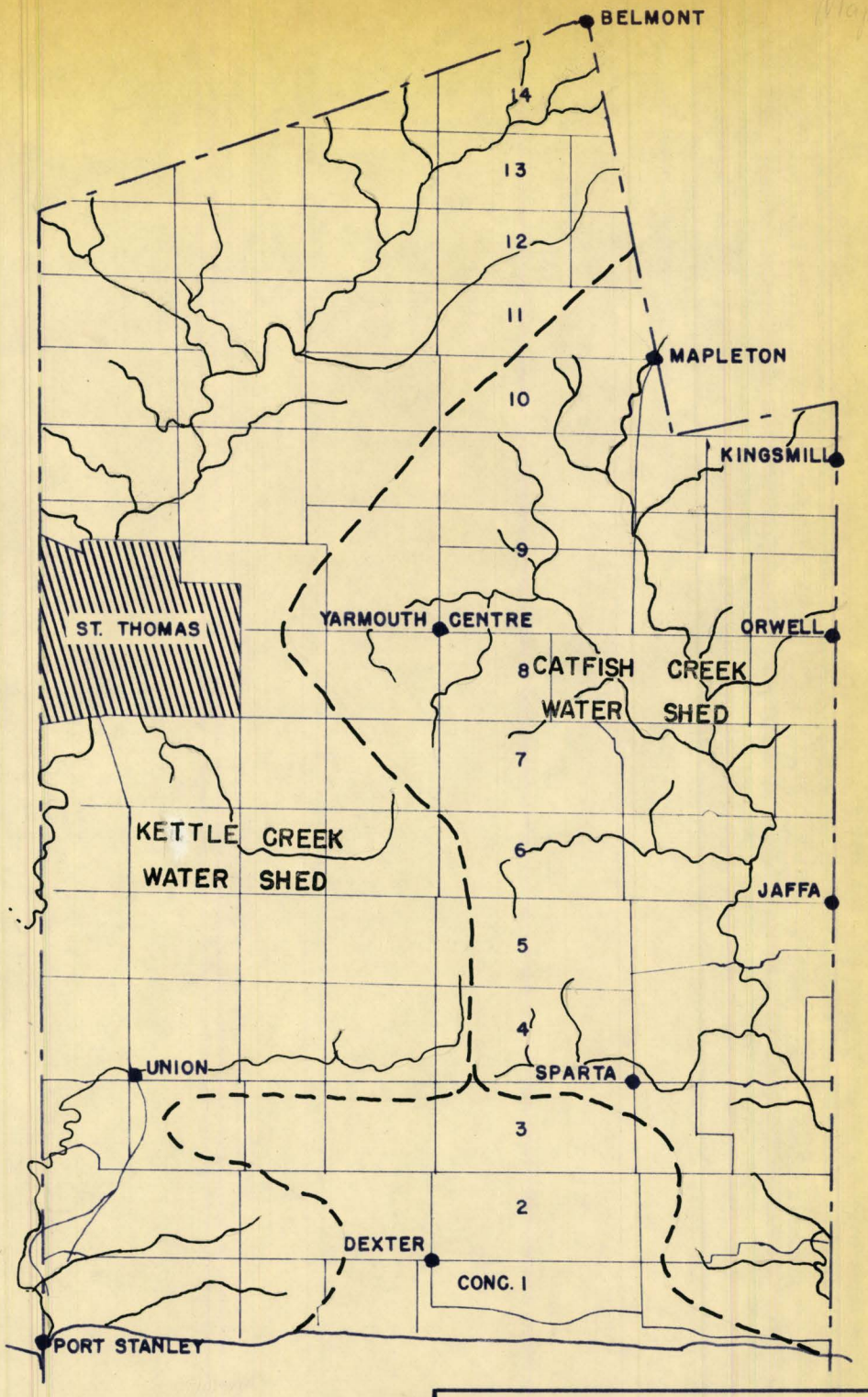
the erosional processes of running water more, to any great extent, than any other.

The original settlers were overly eager in clearing trees from their land. Even the creek valleys were denuded with the result that stream erosion has become a problem especially in the south along the main streams with their large volume of water capable of erosive work.

Over ten per cent of Yarmouth township is classified as either bottomland or eroded with the major emphasis on the latter (6.8%).[1] Erosion has produced terraces along the Catfish Creek valley in the vicinity of New Sarum (illus.13). These terraces do not appear related to materials differing in their resistence to the erosional processes. It has been concluded therefore that they are related to a falling base level. As more and more outlets were uncovered by the retreating Wisconsin ice lobe the level of the glacial lakes fell. The base level to which the stream was working was lowered correspondingly and terraces are left as evidence to this fact. Lateral erosion is severe on many of the tributaries of Kettle Creek. Illustration 14 depicts the stream meandering over a broad channel and at the same time doing a large amount of erosive work. The stream bed is used as unimproved pasture and no effort is being made to preserve the clay loam from further destruction. South of

1. The Ontario Soil Survey. Report No. 2. Soil Map. County of Elgin.

Map 4



WATER SHEDS

SCALE 1/2 INCH TO 1 MILE

ST. THOMAS

URBAN CENTRE

ROADS

St. Thomas the volume of Kettle Creek is such that the valley floor cannot be used agriculturally due to the danger of flooding. Such is not the case with the smaller Catfish Creek and attempts to use the bottomland have resulted in a mosaic or irregular sloped fields. Agriculture ranges from unimproved pasture to row crops. Because the area of flat land available for agricultural use is very small a high degree of specialization has taken place within the broad valley between concessions one to three. Poultry and pig raising on an intensive scale is the main agricultural pursuit with less specialization in cash crops such as wheat or soy beans. Erosion is especially bad along the southern concessions of the township. Large gulleys are eroding headwards from the Lake Erie shore bluffs across the sand plain. Although internal drainage is good in the light sandy soil gulley formation proceeds at a rapid pace once the initial drainage channel has been formed. Often gulleys have been the result of the drainage policies of the township. Culverts have been placed under roads at specific intervals and all of the surficial drainage of the fields during a thundershower collects at these points and flows as a minor stream through the culvert and directly south towards the lake. Where the gradient is of sufficient steepness extremely deep gulleys have been created by these water flows. Few attempts have been made to avert further development of these or new gulleys. Often there is no vegetation at all along the banks of the gulleys because

slumping and earth flows are progressing so rapidly that not even grass is able to root. Another reason is that there is little or no top soil in the valley to support vegetation. Reforestation was noted in only a very few areas. Along concession one, lots 20 and 21 a woodlot of young evergreens has been planted by the Catfish Creek Conservation Authority to control the further development of a gulley (Barnum gulley) and to attempt to retard the rate at which the Erie shore bluff is retreating. Two further areas have been purchased by the authority in the Sparta and Jaffa areas with the aim of protecting the existing natural tree growth and to supplement it with plantings of both deciduous and coniferous trees. The Authority hopes to control a major part of the natural storage areas in the water-shed and the sections of the creek flood plain which are so badly eroded or flooded as to be of no real value agriculturally. The city of St. Thomas is attempting to control the upper reaches of Kettle Creek because it is the source of their water. A dam has been erected across the creek about one half mile to the north of St. Thomas and a reservoir of water about one and one-half miles long and a quarter of a mile wide has been created. The official plan states that St. Thomas will use the banks of the creek to the north and west as a natural boundary for the growth of the city. A further suggestion is made that an attempt will be made to reforest the banks of the stream and the surrounding watershed to provide both protection of the water supply and a green

belt as a boundary of the city. In the reservoir district this policy has been instituted with the result that an area of natural beauty has been developed. The reservoir is the home of wildlife, aquatic birds, game fish, amphibians, etc. Swans have been placed there by the civic authorities to further enhance the site. As a result of this official reforestation policy erosion has been checked and a place for fishing and hiking created. Unfortunately this wise policy has not been duplicated south of St. Thomas. The creek flows through Southwold township on its journey south to Port Stanley. It is out of the jurisdiction of the city and even of Yarmouth township for that matter. However St. Thomas does not appear interested in the conservation of the creek area except for its water supply because it dumps untreated sewage into it to be carried through Port Stanley and out into Lake Erie.

SOILS

The original Norfolk limestone plain was severly eroded by the plucking and scarring action of the glacier. This material was carried by the moving ice as was lacustrine clay from the Erie basin and redeposited upon the surface of Yarmouth township, mantling the remaining underlying rock. This glacial drift has been the basis from which today's soils have developed. Because the parent material for the soil is a mixture of more than one type of bed rock from more than one location the soils are referred to as transported. They fall into the Brown forest great soil group

Illus. 12b Three levels of terraces along Catfish Creek indicate falling base level.

Illus. 13 Meandering stream severely erodes flood plain of Kettle Creek.

because the climatic factors favoured deciduous forests as the original plant cover in this area. This soil group is marked by its lack of a pronounced A_2 horizon because the organic products emanating from deciduous trees are not acidic but rather often have a pH factor of more than 7. Percolating water does not therefore show much tendency towards leaching the A horizon of its inorganic nutrients.

High temperature means vigorous activity on the part of living organisms and a large volume of precipitation indicates that there will be much water passing through the soil body carrying nutrients and organic acids. These factors serve to develop deep soil profiles. As has been seen both temperature and precipitation are moderate in the study area with the result that soil profiles are shallow in depth, especially soil in the not too porous clays. A series of test holes were dug to examine the soil profiles and they did not reveal the presence of hard pans in any part of the study area. The closest thing approximating this factor was large lenses of clay deposited by glacial activity and now underlying the soil profile. The absence of pans was taken as additional evidence for the lack of acidic soil water moving through the profile and as further reason for including the soils of this area in the Brown forest great soil group. If pans were found it is likely that the soils would have been classified as Podzolic.

Alluvial soils are encountered on terraces associated with old meanders in the valleys of present day creeks.

Those located some vertical distance above the creeks show horizontal development in the overlying alluvial material because they are older and have had time to develop a profile. In other areas the terraces have been eroded free of the finer silts and sands during flood conditions of the stream and show less profile development. The old meanders of Kettle Creek are farmed. The black organic soil body is not mature because it shows no pronounced profile development. A test hole revealed only black peaty material laden with roots and other debris from a fairly recent stand of tree growth. Thus the soil is fertile here because of its organic content although it is wet. It is the high water table that has prevented the development of a mature soil because surface water is unable to penetrate downward to any great extent.

A soil type map has been drawn for the study area based upon similarity of parent material, slope, drainage and crop type. The map is related to the physiographic and gravel deposits maps (2 and 3) because glacial activity has created specific land forms composed of glacial till of various types and texture. This past glacial activity directly affects the type of parent material available to the soil forming processes and concomittantly the slope and drainage.

Type I - Well Drained Loams

Soils of this category are found in morainic deposits.

The St. Thomas moraine soils fall entirely within the classification but only the most northerly part of the Tillsonburg is included. Because moraines are hilly structures of glacial deposition it follows that the slope of the soil profile is fairly steep although it is by no means uniform. Drainage is good both surficially and internally due to slope of the land and both Miami clay loam and Miami loam are found within this classification with the former predominating in area covered. Illustration 14 shows a profile of Miami clay loam in an apple orchard just north of Sparta. The soil is very heavy and free of stones in this area. The profile is shallow measuring only 16 inches in its entirety. There was a covering of grass and clover sod comprising the A_o horizon and there is downward movement as shown in the darker band half way down the profile as shown in Illustration 14. This zone of accumulation comprises the B horizon which measures about four inches in depth. The subsoil found below the B horizon is clay, light brown in colour. The whole profile indicates that the soil is not extremely porous yet the internal drainage is good. But the surface drainage is better because of the moderate slope of the moraines.

Type 2 - Well Drained Loams and Sand

The soils in this grouping have developed from very gently rolling parent material in the vicinity of both of the creeks in the township. It is possible that the light sandy silty material underlays much of the lacustrine clay

SOIL AND TYPES IN YARMOUTH TOWNSHIP

SCALE 1 INCH TO 1 MILE

- WELL DRAINED LOAMS
- WELL DRAINED LOAM & SAND
- WELL DRAINED SAND LOAMS
- WELL DRAINED GRAVELLY LOAM
- IMPERFECTLY DRAINED LOAMS
- POORLY DRAINED SAND LOAM
- POORLY DRAINED CLAY
- BOTTOM & ERODED LAND

plain. It has been exposed because the creeks have breached the overlying clays. Internal drainage is especially good due to the light structure of the soil, but when surface drainage is excessive then sheet erosion is bad. This susceptibility to erosion probably accounts for the fact that the creek valleys are especially wide where they pass through this material. There is little stone in the soil of this soil type and it is as stone-free as type I. It does not appear as fertile as those in type I because the more demanding cereals such as wheat are not grown in this last type to any great extent. Haldiman silt loam, Miami silty clay loam, and Ottawa sand comprise the membership of Land Type 2.

Type 3 - Well Drained Sand Loams

These materials are found in the flat lying sand plain in the south of the township and in the vicinity of Jaffa near Catfish Creek. It is likely that the parent material is composed partly of deltaic deposits of both Catfish and Kettle Creeks from an earlier period and from the shore deposits associated with glacial lakes such as Lake Warren. The slope of the land is flat to gently rolling; therefore surface drainage is minimal. However internal drainage is good for the most part due to the porosity of the soil. In some areas the lighter sands are underlain by clay which occurs occasionally as lenses but more often the deep underlaying materials are dense clay

overlain with only a shallow layer of sand. The thickness of the sand varies from tens of feet to less than five and has necessitated another land type (Type 5). Oshtemo loamy sand, Fox sandy loam and Berrien loamy sand are the components of land type 3. The profiles are in all cases deep with no leaching of visible A_2 horizon in the ploughed field where the test hole was dug. The soils were reported by interview as being not extremely fertile and having a low content of organic matter. However they are very workable due to their light texture and are utilized extensively as high grade tobacco lands with fertilization. Although the Berrien sandy loams are listed in the Ontario soil survey map as imperfectly drained their use does not change appreciably in the field from other members of this soil type. Therefore they have been included within this category.

Type 4 - Well Drained Gravelly Loam

This material comprises the floor of the large spillway located between the two lobes of the Tillsonburg moraine and the lower sides of the moraine itself although it also occurs to a small extent elsewhere. The parent material for the soil type is the glacio-fluvio sands and gravels deposited by meltwaters from the retreating ice lobe, which have developed into the present gravelly loams. As the name indicates stone is present in the soil profile but it is by no means plentiful. Although slope varies from moderate to almost flat and the surficial drainage is good.

Because the parent material is porous the internal drainage is equally as good. Miami gravelly loam is the single soil within the type and the profile is not especially well developed. However the organic content is higher than that found to the south in the sandy soils because a better growth of grass is supported. Because of the presence of small gravels it is not as easy to work with machinery as would be the aforementioned sands. Land use appears little different from that of the Miami loams and clay loams of Type I with the same emphasis on cereals and pasture.

Type 5 - Imperfectly Drained Loams

The till and lacustrine and sand plains (Map 3) are the site of the next land type. Gently rolling topography is a feature of the till plain but the lacustrine plain is extremely flat except where it is cut by branches of Catfish Creek. The parent material for the soils developed on the till plain had its origin in the layer of ground moraine deposited by advancing ice lobes. Because the morainic material is fairly heavy clay except where it has been mixed by the advancing ice lobe to a slight degree with the sandy beach deposits of glacial Lake Maumee, internal drainage is not everywhere good. Surface drainage is often not good either so that the soils tend to be imperfectly drained. This poor internal drainage is reflected in the shallow profile development with bands of mineral accumulation close to the surface of the soil. The soils which have developed are clay loams, fertile but difficult

to work. They are by no means unusable but rather interviewing revealed that yields of beans and cereals are good, but there is some delay experienced in getting onto the land for spring ploughing. The two soil types of land type 5 are Conover clay loam and Conover loam, with the former predominating in area covered. The Urstromtaller or trough immediately south of the Tillsonburg moraine is also floored mostly with Conover loam. The profile of Conover loam (Illustration 15) reveals a shallow profile, a zone of accumulation near the surface and a dense light brown parent material. The measurement of the horizons was difficult to ascertain because there is no definite or regular line of separation between them. Semi-rounded water-worked stones were encountered in the blocky clayey subsoil. The whole profile measures only about ten inches in depth with the A_1 and B of equal depth and the A_2 not visible in the hole dug in a ploughed field.

Type 6 - Poorly Drained Sand Loam

This land type is found only in the first three concessions in the township on part of the flat lying sand plain and the imperfectly drained sand over clay plain (Map 3). Both internal and surficial drainage are limited because the topography is flat or gently rolling and the thin layer of sand loam lies immediately above impermeable clays. The clay is encountered in some places right below the surface in the poorly drained sand over clay plain because much of the lighter sand has been removed by sheet

wash during sharp showers when runoff is at a maximum. The soil members of this type are Granby sand, and Brookston sandy loam. Illustration 16 is a profile of the poorly drained Granby sand. The parent material is light yellow sand which becomes heavier at depth due to an increased clay content. It is possible to ribbon the damp soil between the fingers because of the presence of the clay. It is this factor that causes this soil member to be poorly drained. There are only two recognizable horizons in the profile, that of a deep A zone with the possibility that the bottom part of it is the B or the zone of accumulation and the light yellow parent material. A hole about 24 inches deep was dug with the A horizon measuring approximately eight to ten inches. Brookston sandy loam has a far shallower layer of light sandy material resting upon a subsoil of heavy clay. Often it is difficult to be sure if sand is even in existence in the more poorly drained areas. It appears possible to correlate the areas of occurence of these two soil groups with the thickness of the light sand over the till displayed on the face of the Lake Erie shore bluffs. Where the sand layer is thin over the till then the same conditions appear to exist further inland because the soils fall into the two aforementioned groupings. The Granby sand is lighter to work than the Brookston sandy loam and therefore less demanding; row crops such as potatoes are grown. But the Brookston sandy loam is heavier and supports cereals and even hay in the more poorly

drained areas.

Type 7 - Poorly Drained Clay

Heavy poorly drained clay which does not appear related to any specific physiographic feature is found scattered throughout the area. It occurs in flat laying or depressional areas. Because the soil is heavy sticky clay and surface drainage is limited, it is very poorly drained. The surface texture is so heavy that considerable difficulty is encountered working the land. Often it is left in tree or sod cover. Brookston clay is the only soil in the type and illustration 17, dug through a heavy grass sod indicates that little profile development has occured because water cannot percolate freely through the soil body. Organic material is high in the surface layers because it is not leached and because decomposition is slow. Therefore the soil profile is about ten inches thick, dark in colour, and rests upon the dense light brown clay which constitutes the parent material.

Type 8 - Eroded and Bottom Land

Although slope and drainage are not similar in these two categories they have been placed in the same land type because they show the characteristic of being of limited use. Often bottom land is flooded but where there is a flood plain wide enough to allow drainage when the stream shrinks in size during the summer, it is utilized agriculturally. But this does not happen often enough to warrant

Illus. 14 A profile of Miami clay loam.

Illus. 15 A profile of Conover loam.

Illus. 16 A profile of Granby sand.

Illus. 17 A profile of Brookston clay.

creating a separate land type. Eroded land occurs in almost all cases in conjunction with running streams or wave activity along the present Lake Erie shoreline. Slope ranges from extreme along the sides of the steep gullies to practically none near the creek bottoms. Therefore the eroded land would range from well to poorly drained.

This general survey of the soils with the aid of the soil type technique illustrates that there are soils of varying degrees of agricultural usefulness. Much of the township may be rated as having excellent soils for a variety of crops. But at least ten per cent of the total land area is useless and will remain so unless some method of reclamation is instituted.

NATURAL VEGETATION

Little remains of the original forest cover in Yarmouth township because it was cleared to make way for agricultural pursuits. There are areas of very poor drainage however, such as the imperfectly drained clay plain, which were never completely cleared. From the secondary growth in such areas it is possible, with the aid of writers, to reconstruct the appearance of the original vegetation. In 1851, from Staffordville to St. Thomas the timber was hardwood, intermixed occasionally with a little pine ...[1] The hardwood was composed predominantly of sugar maple and

1. Smith, W.H. Canada, past, present, future. 1851

beech on the well drained soils. Soft maple and elm occupied the poorly drained areas with oak dominating the sand plain in park-like stands. There were some conifers in the very wet and swampy areas, made up of cedar, hemlock and white pine. Soft maple and yellow birch were also found here. Initially almost all land was cleared of trees but the land that was too wet to farm has been allowed to revert to woodlot. Deciduous trees still predominate in these areas with the emphasis on maple. There are large stands of conifers where reforestation has been a deliberate policy such as in the St. Thomas water reservoir area, but few occur natually. It is suggested that a better picture of the immediate past will be gained in the future as the provincial department of agriculture gains the legal right to enforce its policy of maintaining present woodlots and encouraging the creation of new ones.

CHAPTER III

RURAL LAND USE

History of Settlement

Prior to the arrival of white explorers, Yarmouth township contained a number of Indian settlements. The Indians tested the agricultural possibilities of the land by maintaining small patches of corn, pumpkin, beans and tobacco. However few lessions could be gained from the agricultural pursuits of the Huron Indians because the Iroquois extended their control from Northern New York state and effectively destroyed the Huronian culture. When the French influence reached Upper Canada it made little difference to Iroquoian agriculture because the French were more interested in furs than farming.

After the British conquered Canada, settlement began in earnest in Ontario, then called Upper Canada. Governor Simcoe deemed it advisable to encourage a really intensive settlement of Southwestern Ontario because this area could be used as a base to dominate economically the mid-western states of the United States of America. United Empire Loyalists had already established settlements along Lake Erie such as those at Long Point and Yarmouth township after the American wars of independence from 1775 to 1783. But after the war there was to be a more organized programme of settlement with land surveys and land agents to parcel out property to legitimate settlers. One of the men

selected for this job was Thomas Talbot, who had accompanied Governor Simcoe on his trip through Upper Canada, and perhaps aided the governor in arriving at his conclusions for the future role of all of Southwestern Ontario. Talbot originally wanted to establish himself at the mouth of Kettle Creek because he foresaw its potential use as the hub of a transport network that could tap the resources of the interior of Southwestern Ontario. However Colonel Bostwick already controlled lots one and two on the first concession and Talbot was forced to move on westward and settle in Dunwich, two townships further west. He did not, however, lose his desire to encourage settlers into Yarmouth township and he asked the governor to survey the area and establish lot and concession lines. In 1801 Bostwick had blazed a trail across the mid-section of the Township and in 1811 Burwell surveyed this trail and it was established as the Talbot road or the present day number 3 highway. This road was used at first by the loyalists coming from the United States and later by people pushing west from New York state via the Niagara frontier. Often these people were just passing through Ontario on their way to the mid-western states, but some of them remained behind in Yarmouth and other townships along the route.

The main settlement of Yarmouth occured in the early 1800's in three major phases. The southern concessions were the most accessible because Lake Erie could be used as a travel route. The original settlers in the past, the

Baby family, engaged a land agent who was a Quaker who encouraged people of like religion to settle in large numbers. (See illustration 18). This was the first stage of settlement. The second major area of settlement was in the middle reaches of the township in the vicinity of the Talbot road. These people were mostly English and Americans by birth. The last thrust of settlement occured almost simultaneously with the others. Highland Scots, still plagued with unemployment dating back to the disruption of their clan system in 1707 by the English invaders, emigrated to the northern part of Yarmouth township and immediately engaged as had the others, in clearing their alotted land prior to farming.

The preliminary to farming was cutting down trees. Often this activity could be made profitable if the growth was good for lumber and suitable means for transporting the wood products to markets could be found. Thus even a little hamlet such as New Sarum prospered as a shipping point for lumber via Catfish Creek. This wood was also the basis for woodworking industries that produced barrel staves. The first products from the cleared land were wheat and a little later apples from the newly established orchards in the south of the township.

By 1851 the first Canadian census indicated that the population of Yarmouth was over 5000 (5288). Settlement was thus fairly complete by even this early date and the population figures remained relatively static until the period of 1941 to 1951 when the figure rose from 5,381 to

9,203 and in the period 1951 to 1956 when the population increased further to 10,224.

Figure 3 (a) indicates that in the ten year period from 1941 to 1951 only farms of less than ten and more than 200 acres show any appreciable increase in numbers whereas the farms of intermediate size show a decrease in number for the same period and in fact for the 15 year period from 1941 to 1956. It is suggested that this sudden increase in population was therefore not reflected in the creation of new farms, and was probably due to a flood of immigrants arriving in Canada in the immediate post-war years who were required by law to enter rural areas to serve as farm labour, and secondly to returning veterans attempting to create small rural holdings in Yarmouth. As the immigrants left the farms and entered the urban labour force one would expect that the population figures would drop again. But such was not the case because the vacuum in the population has been filled in recent years by families of urban workers establishing their homes on small plots of land along the major paved roads in the township. Another factor in keeping the rural population high is the automobile. Previously many young people left their rural homesteads to seek employment in the cities, but now with the widespread ownership of automobiles these young people need no longer live in their place of employment but rather are able to commute daily from the farmstead to the city.

The economy gradually changed in character from the

ST. THOMAS

ST. THOMAS MENTAL HOSPITAL

Map 9

LAND USE MAP

SCALE 1 INCH TO 1 MILE

WHEAT	M MARKET GARDEN	URBAN
OATS	ORCHARDS	RECREATIONAL
BARLEY	TOMATOES	C CEMETERY
RYE	PASTURE	
CORN	I IMPROVED	
SOY BEANS	U UNIMPROVED	
POTATOES	HAY	
TOBACCO	NONPRODUCTIVE	
HORTICULTURE	I INDUSTRIAL	
G GRAPE VINE	WOODLAND	
N NURSERY	R REFORESTED	

early dependence upon lumber and wheat and apples to a more diversified one based on many types of crops limited only by physical conditions such as climate, fertility of soils etc. and by economic conditions prevailing at different times in the history of Yarmouth township.

Wheat

Wheat occupied a more important place in the economy in the past than it does currently. Figure 3B shows declining production from 1851 to 1871. This is probably the result of the repeal of the corn laws in 1846 by the British prime minister, Lord Peel. However, the area put into production increased to 10,000 acres from 1871 to 1881 probably because of the disruption of trade and agriculture in Europe due to the Napoleonic wars. France is traditionally a heavy producer of wheat; her agriculture languished during the wars, and Canada was able to fill the increased European demands. However, as demand fell, as the soils became depleted of their high fertility, and as the hard wheat from the Canadian west became plentiful, production dropped in Yarmouth to a low of 2652 acres. Production rose again from 1931 to 1941 because of the increased demands emanating from the World War II effort. This demand held constant after the war in 1946 because the destroyed European economy needed several years to recover. The rise in production was modest however, because once again the hard western wheats were more in demand as bread grains than the Ontario soft wheat. Thus by the end of 1956 pro-

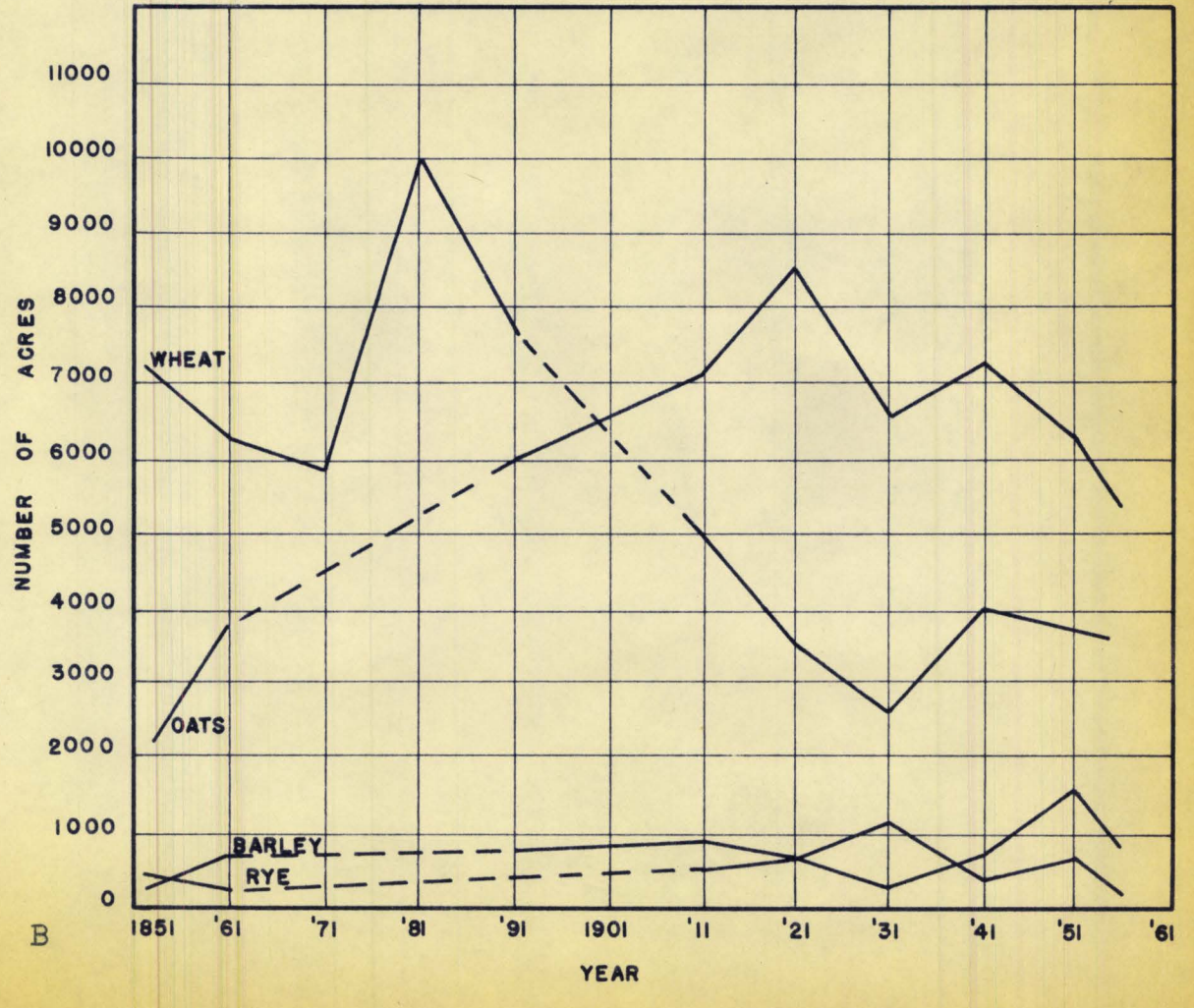
Fig. 3

CENSUS RECORD OF FARM SIZE

YEAR	LESS THAN 10 AC.	10 - 50	50 - 100	100 - 200	OVER 200
1851	106	147	311	127	26
61	17	116	350	118	25
71	140	162	329	143	35
81	204	163	312	163	43
91	367	194	295	174	39
1901					
11	271	225	318	165	25
21	160	243	311	168	15
31					
41	114	172	266	172	23
51	191	152	222	114	47
61	58	159	185	97	56

A

CENSUS RECORD OF CROPS



B

duction stood at 3,874 acres.

The Land Use Map (number 6) indicates that wheat is fairly widespread in distribution although acreage is higher in the northern part of the study area than in the south. Fields are also larger in areal extent to the north than to the south. Wheat is found to a greater degree on the poorly-drained sand loam (type 6) in the south than on any other soil type here. This is a reflection both of the unsuitability of the well-drained sand loams and of the fact that they can be used more profitably for other crops. In the north there are large fields of wheat on both the till plain and the St. Thomas till moraine. It is suggested that the moraine was only recently cleared of trees because there is more acreage under trees here than in the south even today. If the land was cleared then it would have been difficult to work with animals because of the slope. Therefore it was only the advent of modern tractors and machinery that made working the land economically feasible, so that the farmer would undertake to reduce the area of his woodlot and plant the crop that has traditionally gone into recently cleared land, wheat. Climate does not appear to be a limiting factor in wheat distribution anywhere in the township because there is the needed precipitation early in the growing season and the necessary late summer drought for harvesting. Therefore there is also a scattering of wheat across the lacustrine plain and the Tillsonburg moraine, wherever local conditions are suitable.

Illus. 18 This plaque in Sparta commemorates the foundation of the original Quaker meeting house.

Illus. 19 Typical crop combination of wheat, corn and pasture (in the background) on Concession 10.

Oats

Oat production increased steadily from the period of initial settlement until 1921. After 1921 the area planted began dropping from the high of 8,622 acres to the low of 5,242 acres in 1956. The reasons for the decline in oat production are probably related to the decline in horse population and the fact that land used for oats is now used for higher paying cash crops such as soy beans. Oat production has remained fairly high because it is used for animal feed for dairy and beef cattle as well as mixed feeds for calf starter feeds, and poultry.

Because of the fairly humid climate in Yarmouth and the late summer drought the growing conditions are excellent for oats. Oat fields are scattered throughout the entire township excluding only the well-drained sand loams which are used more profitably for other crops.

Barley

Barley does better in a drier climate than that which prevails in the township. Therefore its acreage has historically been small; rarely more than 1000 acres. There was a slight rise in production from 1931 to 1951 associated with the second world war and the post war demands for Canadian agricultural products. However this demand has not been sustained and areal extent has returned to prewar levels of approximately 800 acres.

The distribution of barley is widespread occuring

Illus. 20 The poorly drained sandy soils of Concession 3 support oat crops. The Tillsonburg Moraine is in the background.

Illus. 21 Fields of rye with tobacco-drying kilns in the background are typical of the tobacco growing region in Yarmouth.

in close association with oats. These two small grains are grouped together on the land use map because it was practically impossible to differentiate between them in the early stages of growth when the agricultural land use of the township was mapped.

Rye

Rye production is even lower than that of barley because there is little demand for it as a cash crop and it is of little use as animal feed. Traditionally the area sown has remained about 500 acres with little fluctuation in acreage.

Rye is a light feeder in terms of soil nutrients and is found upon the less fertile well-drained loam, sand and sand loams in the south of the township in the vicinity of the early deltas of Kettle and Catfish creeks. It is an excellent second crop in conjunction with tobacco because it holds the light soils against aeolian erosion, does not deplete the fertility of the soil and provides a fairly good cash return, while the straw can be used as a mulch to give good structure to the light soil.

Corn

The climate with its late summer drought is fairly good for corn although by no means as good as that of the American corn belt across Lake Erie to the south. However the growing season is fairly humid during the period of maximum growth and fairly dry during the tasselling and ear

stage. This leads to conditions conducive for good yields.

Demand for corn is good in Yarmouth because of the high pig, poultry and dairy cattle population. However its distribution does not correlate precisely with the highest densities of these animals, perhaps because dairy farmers are also interested in pasture and hay production and the hog producers equally interested in cash crops such as wheat and soy beans. Also prepared feeds are now bought for animal feeds and there is not the emphasis on complete feeding of animal units from the farm itself that there once was before the production of mixed feeds.

Soy Beans

This crop is a recent one in terms of introduction into the township, but acreage has grown rapidly because there is a good market for soy oil and because the price is stabilized by the London Bean Marketing Board. The Yarmouth climatic regime favours its growth and the soils are sufficiently fertile. Hence its distribution is widespread with perhaps slightly more emphasis on its production in the imperfectly drained loams of the lacustrine plain. Little is found in the well-drained sands and loams in the south of the township because of the fair fertility and dryness of the soils and because they are used for more highly paying cash crops.

Potatoes

Potatoes have a long history in Yarmouth because

there are areas of light sandy soils which favour development of the tubers. Therefore potatoes are found closely associated with the light but poorly drained sand loam and in the fringe areas of the well-drained sand loams where they make contact with the less perfectly drained soils. Their distribution is limited then to the extreme south of the township. As a cash crop they are valuable because production is high and large local urban markets available. Truckers buy the crop at the farmsites and transport it to places as far away as Toronto. Production could be increased if potato acreage were extended onto the better drained sands, but as long as tobacco prices hold this is not likely to occur. Potatoes are not heavy feeders and thus the soil need not be especially fertile. Production has been retarded in the past because this factor was not realized and heavily fertilized fields encouraged the development of potato scab. However with a reduction in application of fertilizers this problem will be solved.

Tobacco

Tobacco is located primarily upon the light well-drained loams, sands and sandy loam located in the southwest of the township and around Jaffa at the old delta of Catfish Creek. The texture and drainage of the soils are the most crucial features for tobacco growing because artificial fertilizers may be added to achieve the desired levels of soil fertility. Therefore tobacco has only recently been grown in Yarmouth due to the advent of cheap

Illus. 22 The lacustrine plain supports fine crops of soy beans.

Illus. 23 Clean tilled row crops such as tobacco encourage erosion on the light sandy soils of concession 1.

artificial fertilizers and an increase in the tobacco market. Farms growing tobacco are extremely specialized with almost total emphasis on their crop. The average tobacco acreage per farm is forty although the exact amount per farm is set by the Ontario Tobacco Growers Marketing Board at Aylmer. Each farmer is allowed seven and one-half acres per kiln in order that the market remain stable.

Tobacco farming needs a large labour force on hand beginning with the growing of the seedlings in greenhouses and continuing to the final picking of the bottom leaves or sand lugs in early September. This labour is obtained locally from the small surrounding hamlets and St. Thomas, as well as from the larger cities in Ontario such as Toronto, London, and Windsor.

The late summer drought as shown by the Thornthwaite water budget is not conducive for good tobacco growth and therefore irrigation is needed. Water is obtained from wells or more commonly from small ponds that have been created on the farm by damming tiny tributaries of the main creeks. Because the rows of tobacco are clean tilled and the surface soils become quite dry in late summer blowing and drifting of the soils becomes a problem. Hedges of pine have been planted around the edges of the fields to protect the soil under tobacco and the plant itself from damage by wind, while, as indicated above, rye is used to prevent unused tobacco land from ending.

Horticulture

Vineyards, small fruits, nurseries and market gardens make up this category of land use. Crops such as grapes and small fruits were more common in the past than today because now there is stiff competition from more ideally located fruit belts, in the Niagara Peninsula, which specialize to a greater degree than is possible in Yarmouth township. Holdings of this type are usually small and the produce is often used locally or on the farm itself rather than for a large commercial market. However grapes of a table variety are produced on a fairly large scale and sold in St. Thomas and London. The Garden Centre, shown in illustration 24, is a nursery located on the fourth concession on Fruit Ridge Road; it grows ornamental shrubs and trees for householders in St. Thomas.

Most of the horticultural land is located in the southern half of the township especially around the Fruit Ridge Road and north of Port Stanley. In both areas the temperatures are ameliorated by local climatic variables. The Fruit Ridge Road is located along the top of the Tillsonburg moraine which has excellent air drainage. Frosts are rare then during the late spring and early fall and ideal conditions for tender fruits prevail. The Marr Brothers' vegetable farm at Port Stanley is able to take advantage of the fact that Lake Erie helps to maintain above-freezing temperatures for a longer period in the fall. This vegetable farm is the only large scale operation

Illus. 24 The Garden Centre is a nursery located on the Fruit Ridge Road.

Illus. 25 Vineyards on the Fruit Ridge Road.

specializing in market gardening in Yarmouth township. The reasons given in an interview were that the area had a long frost free growth period, the organic matter in an old meander of Kettle Creek provided fertile soils and very importantly, these men held a contract to supply fresh vegetables to a large supermarket in London.

Tomatoes are designated by a separate colour, Map 6, although production is very limited because it shows a very interesting correlation with ethnic distribution. A large amount of hand labour is needed for field tomatoes, to hoe and harvest the crop, and the Dutch families with large numbers of children are admirably suited for the job. Therefore the presence of field tomatoes invariably indicated that the farm was owned by Dutch immigrants.

Orchards

Tree fruits are similar to small fruits in that production was much higher in the past. Previously a wide variety of fruits was produced, ranging from soft peaches and cherries to the more hardy apples which were the basis of an apple packing industry. Today only extensive apple orchards remain because the trees producing the more delicate fruits have been destroyed to make way for more competitive crops.

The climate appears to be the major factor in the location of orchards only in the southern half of the township. Because Lake Erie moderates the air temperatures the trees are able to survive the rigors of winter. The areas

Illus. 26 Apple orchards are the most widespread single type of fruit growing on the Tillsonburg Moraine area.

Illus. 27 The apple packing plant of R. S. Mills and Son is located just on the outskirts of Sparta.

supporting the greatest numbers of orchards today are on the top or side slopes of the Tillsonburg moraine and in the vicinity of the tributaries of the creeks. The major reason appears to be the same as that pertaining to small fruits: good air drainage occurs where there are depressions such as creek valleys close to rises of land.

Only one farm specializes almost completely in apple orchards, that of the late R.S. Mills just outside of Sparta, now many hundreds of acres in size. R.S. Mills started this type of farming early and was able to establish markets and develop his own plant for grading and packing apples, using local labour, and to use his own trucks to haul the fruit to market.

Pasture

Pasture has been divided into two categories, improved and unimproved. Improved pasture for the purposes of this thesis is defined as a sown pasture mix which may or may not have had one hay crop harvested from it earlier in the year. This type of pasture is found throughout the township except where tobacco farming is encountered. Previous to the development of tobacco farming pasture was found even here, maintaining dairy herds, but the light sandy soils produced such poor forage that it was a welcome opportunity for the farmers when they were able to enter into the more profitable tobacco growing. The largest fields and greatest density of improved pasture are found in the north of the township on the well and imperfectly

drained loams of the St. Thomas moraine and the till plain. These clay loams are excellent for grass growth because they hold large quantities of water for long periods.

Unimproved pasture is located in the bottoms of the tributaries of the creeks and along the sides of the creek valleys. This grass crop as the name implies is not improved to any degree but rather consists merely of vegetation that grows naturally in creek valleys and bottoms. It is a poor feed for cattle and sheep but it is not of great areal extent.

Hay

Hay crops include alfalfa, clover and pasture mix. These crops are sown to develop hays of high feed value for cattle and, in the case of alfalfa and clover, to build up the fertility of the soil. The distribution of hay does not appear to be related to any specific soil type or physiographic unit. However, as with the case of pasture, it does not appear in the well-drained sand, loams, and sand loams of the tobacco growing regions. The reason is, of course, the same as that explaining the lack of pasture in this area.

Although no records are kept it would appear that alfalfa, clover, and pasture mix occur in about the same proportions throughout the township. The climate fosters good growth of these crops in the early part of the year although their further growth is often retarded after the first haying because of the late summer drought. However

clover and alfalfa are exceptionally good pasture feeds because of their high nutrient values. They are able to support a higher number of animal units per acre than any other hay crop and are therefore a valuable crop in the dairy and beef regions of Yarmouth township. These crops also enter into a rotation scheme whereby pasture mixes occupy the land for periods of about four years. Hay is cut during the first two or three years and the land is then pastured for the latter part of the four year period. Then alfalfa or clover is planted to add nitrogen to the soil in preparation for the following year's crop of grains such as wheat or corn. Hay together with both types of pasture constitutes one of the largest crops in terms of acreage in the township.

Agriculturally Nonproductive Land

This is the last type of land use to be discussed here. It consists of badly eroded or flooded land in the valley bottoms, and along the face of the Erie shore bluffs and of non-agricultural land uses such as the quarrying of sand and gravel deposits scattered throughout the township.

In summary there appear to be three main farming regions that stand out from one another in Yarmouth: the tobacco-rye combination, the potato growing region of the heavier, less well drained sands and the much larger area of general farming to the north of these two. The tobacco-rye and potato regions are located here primarily because

Illus. 28 The quarrying of kame deposits on the Tillsonburg Moraine is the single form of industrial land use in the township.

Illus. 29 The milkshed in the foreground is a symbol of increased specialization in the dairy industry.

of the light textured soils rather than any special climatic influences. Subtle differences exist in the general farming region. On the Tillsonburg moraine part of the farmer's income is still derived from fruit, although the major portion is obtained from cash crops and various types of livestock. Fruit growing was a major type of farming at the turn of the century but today it is very much reduced in importance because of competition from much more suitable areas which are able to specialize on a larger scale. Therefore the farmer grows only those things for which there are local markets and which can compete in price.

Another area showing a slightly greater emphasis on one type of farming than the more generalized farming is the lacustrine plain with its emphasis on cash crops of soy beans, wheat, corn, etc. Livestock of any type are not particularly stressed as they are further to the north and to a lesser degree to the south. The core of the dairying industry is found in the immediate vicinity of Mapleton and Belmont perhaps because this area is especially good for pasture or perhaps in response to the fact that a cheese factory and the Borden's Ice Cream Factory were located here in the past. But these two plants have led to the development of pig raising on an intensive scale in the same areal because of the waste products obtained from the dairying industries.

Therefore in spite of the differences in physiography from the tobacco-rye regions on the sand plain to the nor-

thern boundary of the township the major part of Yarmouth may be referred to as a general farming region which shows slight emphasis on one crop here and there because of local demands or because of slightly different conditions.

LIVESTOCK

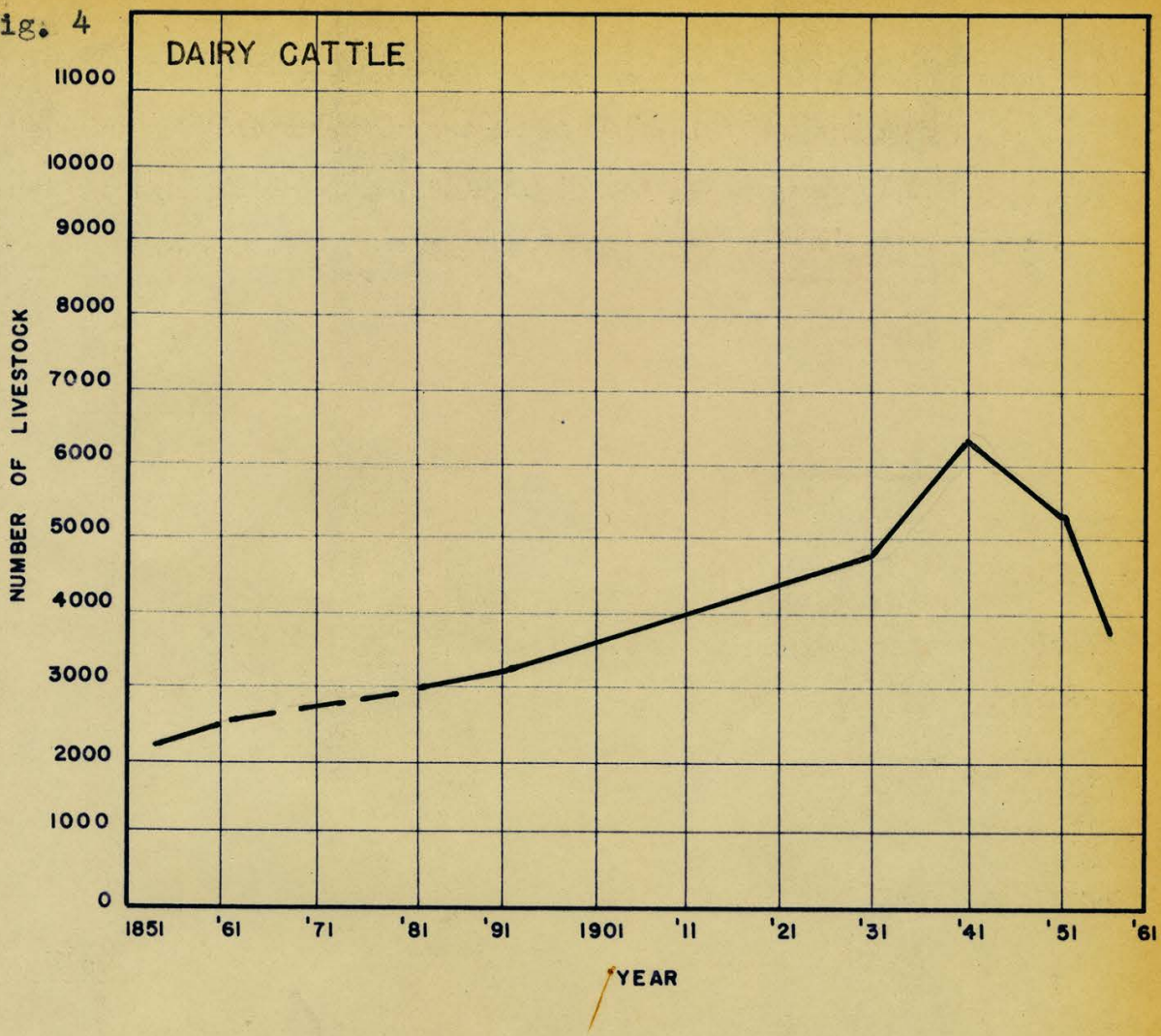
Dairy Cows

Figure 4 shows that there was a gradual increase in the number of dairy cows during the history of settlement from 1851 to 1931, when the number of cows rose from 2220 to 4927. But the second world war created a huge demand for milk products and the number of cows rose to a high of 6632. Since then the number of cows has decreased again as the milk demand slackened to the 1956 figure of 3741.

Dairy cattle are fairly evenly distributed throughout the whole of Yarmouth (see Figure 5) except in the tobacco regions where pasture is poor and cash crop specialization high. However there are small areas where the cow population is particularly higher because of increased local demand for bulk milk. These areas correlate quite highly with Figure 6 which show the various milksheds. All of these milksheds overlap one another, and the highest number of cows appear in most cases where the largest number of milksheds overlap. Therefore there is a high cow population in concessions 10 and 11 on the lots closest to Mapleton because the Belmont, St. Thomas and Mapleton milksheds overlap here. Similarly the number of cows appears higher where the St. Thomas and Aylmer milksheds overlap than to either

CENSUS RECORD OF LIVESTOCK

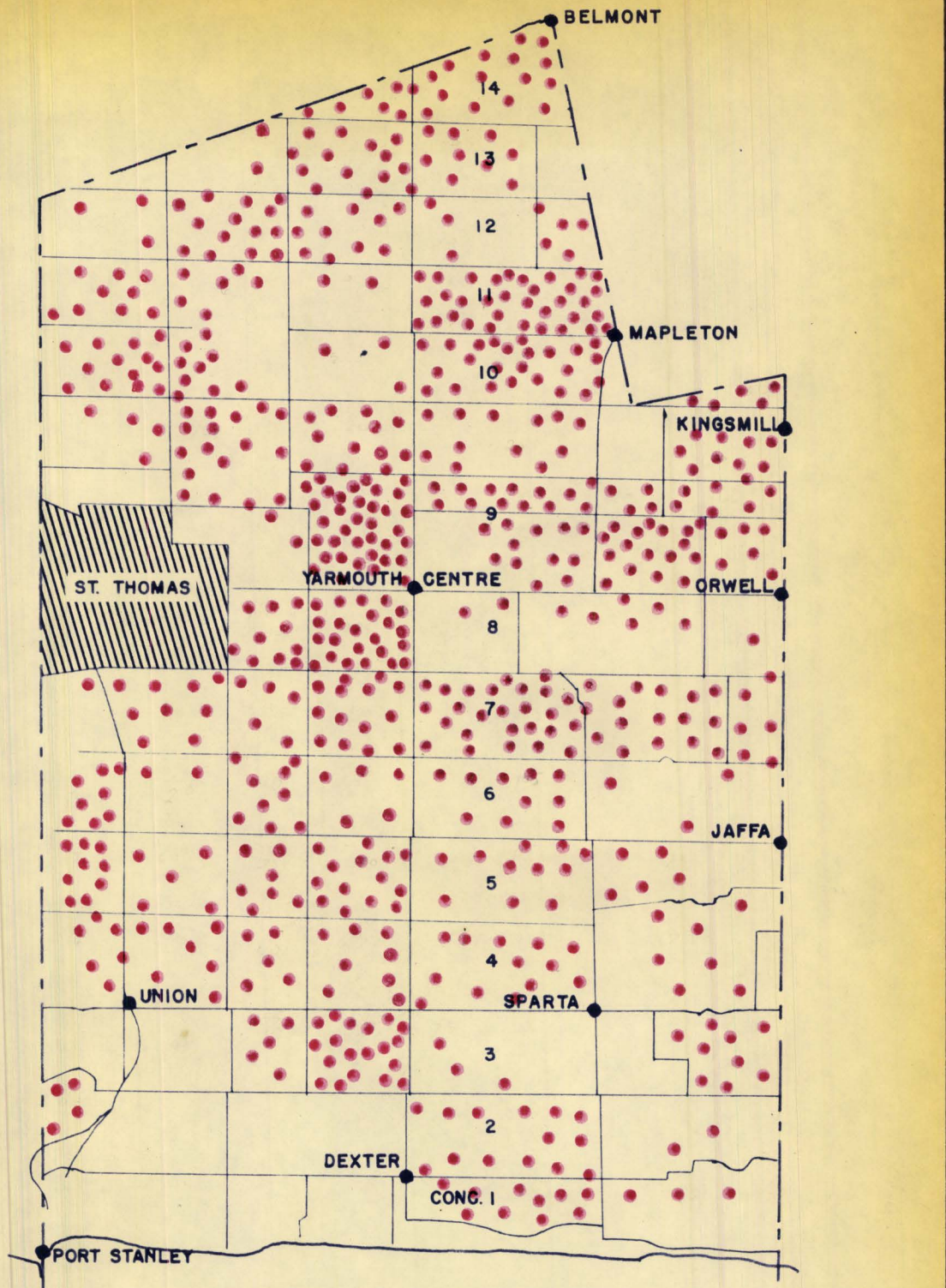
Fig. 4



Illus. 30 A small Holstein dairy herd on the St. Thomas Moraine, Concession 10 provide milk for the Mapleton cheese factory.

Fig. 5

Fig.5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KINGSMILL
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ST. THOMAS
YARMOUTH CENTRE
ORWELL
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JAFFA
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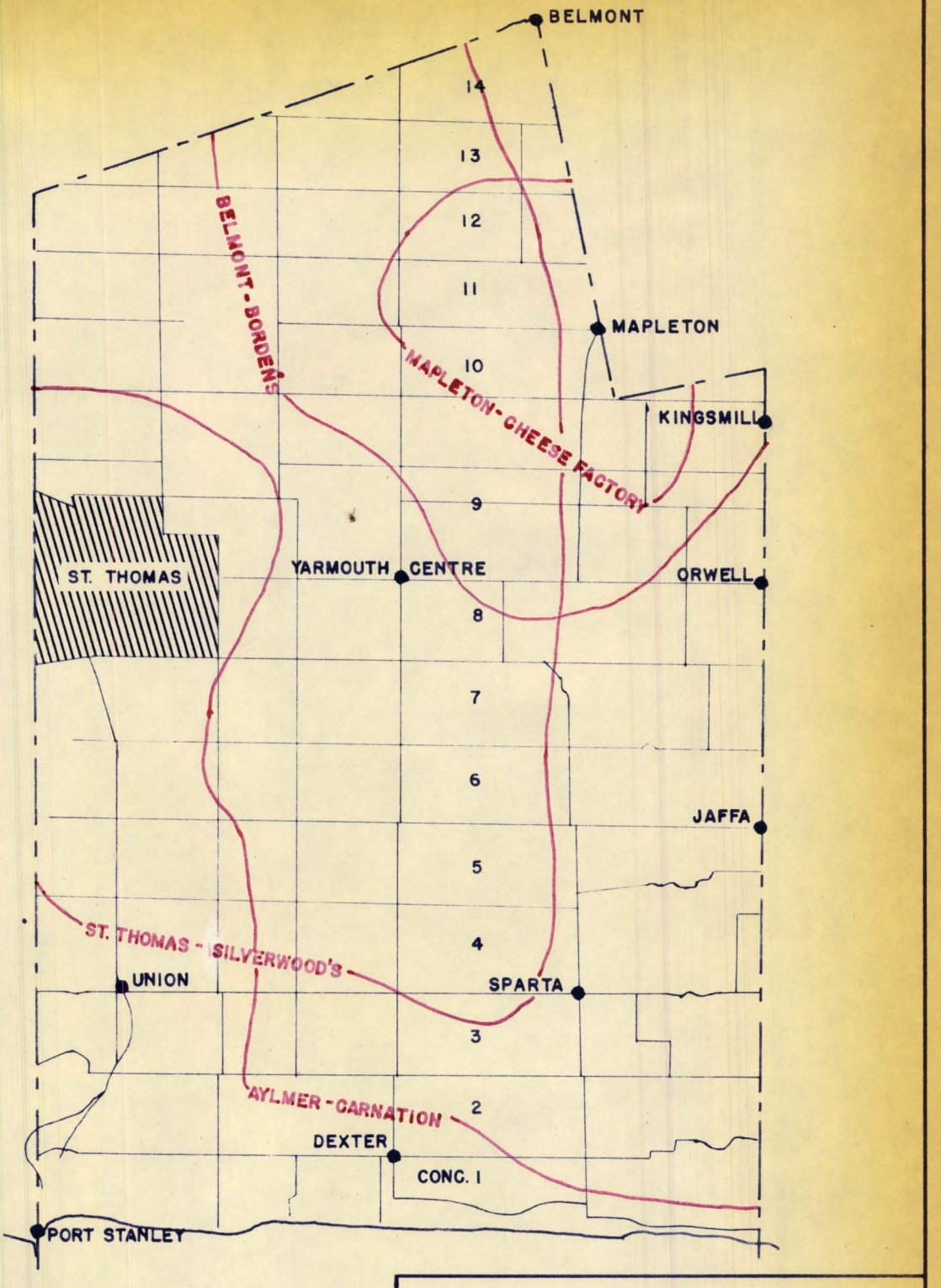
4
UNION
SPARTA
3
2
DEXTER
CONC. 1
PORT STANLEY
DAIRY COW DISTRIBUTION
SCALE 1/2 INCH TO 1 MILE
ST. THOMAS
10 DAIRY COWS
URBAN CENTRE
ROADS

Fig.6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YARMOUTH CENTRE
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SPARTA
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DEXTER
CONC. 1
PORT STANLEY
BELMONT - BORDEN'S
MAPLETON - CHEESE FACTORY
ST. THOMAS - SILVERWOOD'S
AYLMER - CARNATION
MILKSHEDS
SCALE 1/2 INCH TO 1 MILE
ST. THOMAS
MILKSHED
URBAN CENTRE
ROADS

side of the overlap where the single milkshed occurs. In each case these milksheds support industry in the various urban centres associated with them and the name associated with the name of the milkshed in Figure 6 gives some indication of its nature.

When produced on a large scale, bulk milk provides a good income for the dairy farmer. But to gain a contract from a dairy or condenser and to hold it, a farmer must have a large clean operation with a regulation milkhouse and a bulk cooler. These last two improvements necessitate a large capital investment on the part of the farmer. This is having an interesting effect on the dairy farming industry in that small operators who would have to borrow the necessary cash, in spite of the subsidies provided by the dairies as an incentive to get bulk coolers, are selling their herds as beef and entering other lines of agricultural endeavour. Therefore large dairy farms are able to grow larger at the expense of their less efficient neighbours.

Not all dairy herds are used for bulk milk production however. Some herds are used to suckle calves bought from surrounding farms for baby beef or veal and others are used primarily as a source of beef.

Beef Cattle

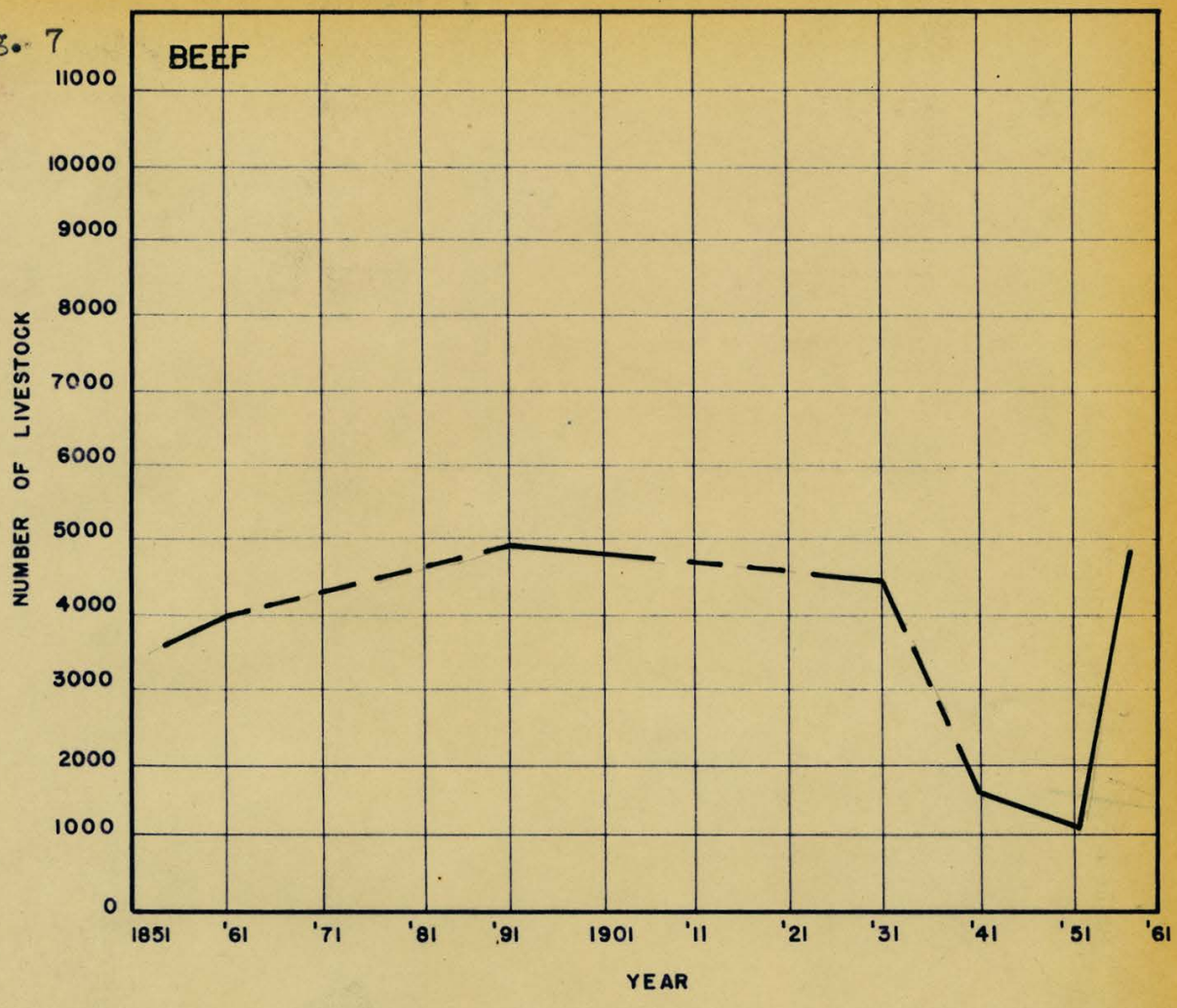
Numbers of beef cattle in Yarmouth remained fairly steady throughout the long period from 1851 to 1931, with the number of cows ranging between 4000 to 5000. Figure 7 shows a marked drop during and immediately after the second

world war period with an equally sharp rise again to 4964 units in 1956. The most likely reason for this fall and rise is that the cattle then used for beef were mostly of the dairy type and during the war it was more profitable to let them continue as milkers because of the heavy demand for milk products than to butcher them for less profitable meat products. The sharp rise also reflects the introduction into Yarmouth of Hereford cattle which are far better producers of meat than ancient dairy cows.

Distribution of beef cattle is rather haphazard throughout the township with small areas of concentration near Belmont, Union, and Dexter. These major concentrations are related to a number of features both physical and human. For example the large herd at Belmont belongs to a retired farmer who does not wish to leave his farmstead. Therefore he has a large beef herd which represents a minimal amount of investment or work. The concentration of beef herds in the vicinity of Union is kept for practically the same reason by a farmer who has turned to developing and working a sand pit in concession 5. This man does not wish that his farm remain non-productive while he works the very profitable pit so he has turned to beef which need very little maintenance. The concentration near Dexter is located on a plain where sand overlies clay. This area is imperfectly drained and more suitable for pasture than for root or tobacco crops. Yet pasture is not rich enough for good dairy herds so the farmers have intro-

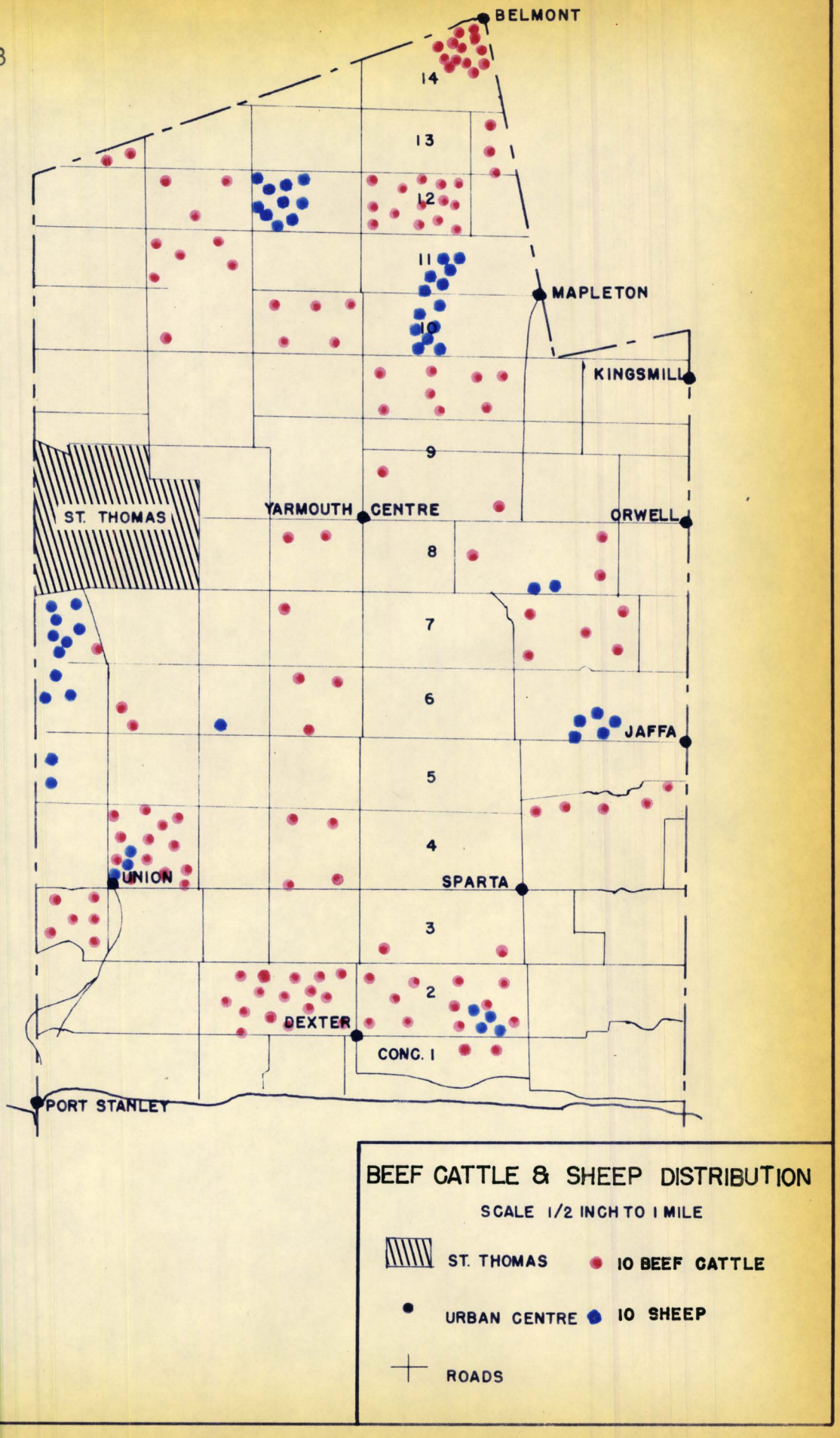
CENSUS RECORD OF LIVESTOCK

Fig. 7



Illus. 31 Hereford cattle are encountered just outside Belmont

Fig. 8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DEXTER
CONC. I
PORT STANLEY
BEEF CATTLE & SHEEP DISTRIBUTION
SCALE 1/2 INCH TO 1 MILE
ST. THOMAS
10 BEEF CATTLE
URBAN CENTRE
10 SHEEP
ROADS

duced Hereford beef cattle.

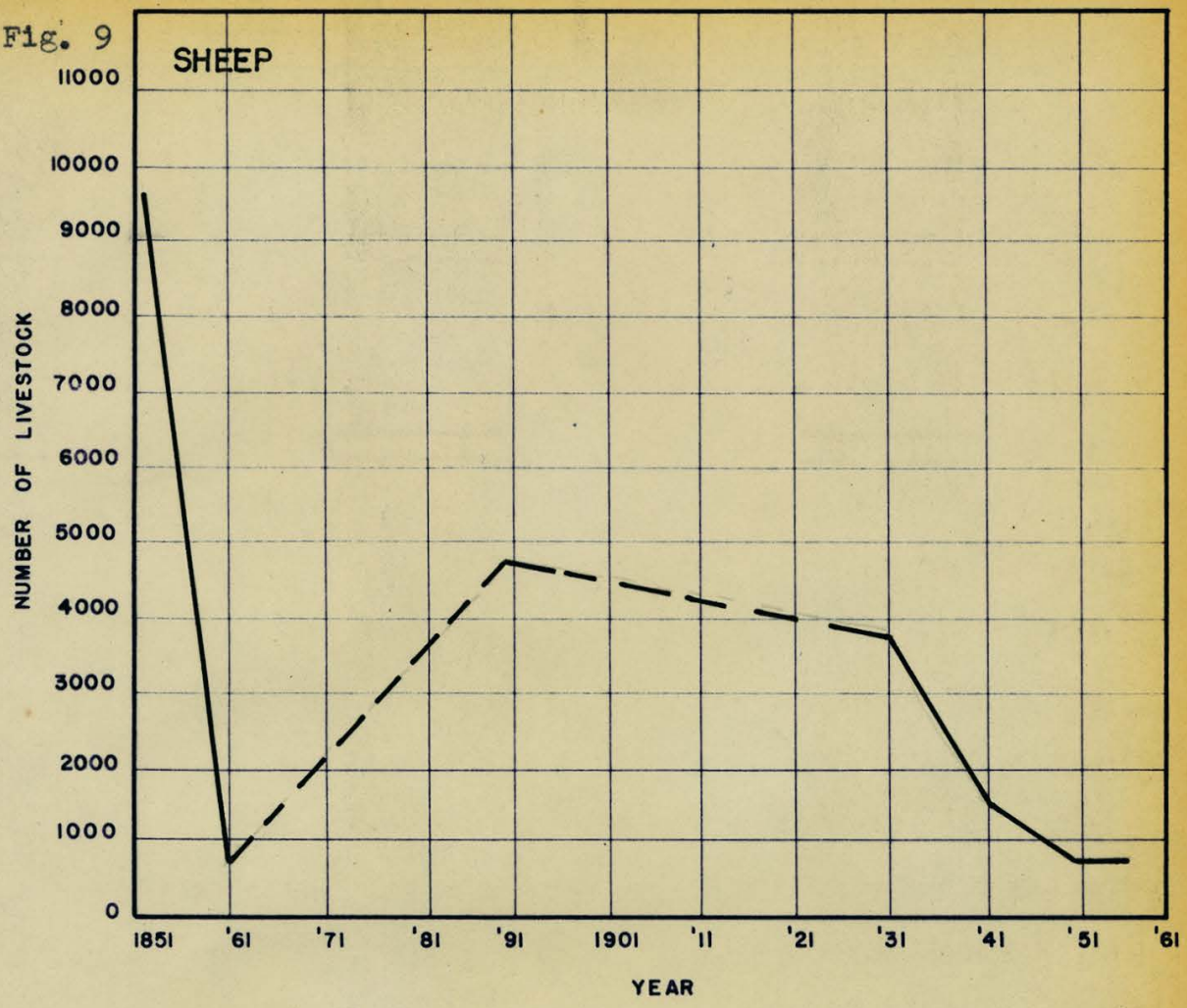
Sheep

When the Highland Scots pushed into the north part of the township in the first stages of settlement they brought with them a traditional highland activity, namely sheep herding. As Figure 9 indicates, the sheep population was very high before 1851 although it dropped to lower levels later on. The first major drop from almost 10,000 units to less than 1000 appears to have been related to epidemics of distemper that periodically swept the herds, especially after the lambs tails were docked and infection set in. Sheep population never again regained the volume attained in the pre-1851 period because more and more profitable uses for the land were found once it was cleared. Another reason was that North Americans gradually developed a taste for beef and the market for mutton declined. Today only a very limited number of adult sheep are kept for their fleece and the spring lambs which they produce. The wool is sold to the Toronto Wool Co-operative Ltd. located in Weston. This firm sends out men who shear the sheep at the farm and then transport the wool back to Weston.

Figure 8 shows the sheep distribution which in many places correlates closely with the heavily eroded land associated with the two creeks in Yarmouth. The small number near Union are a remnant of a much larger sheep industry based on supplying wool to local mills. Other small flocks are scattered widely and owe their existence

CENSUS RECORD OF LIVESTOCK

Fig. 9



Illus. 32 Sheep herding does not have the importance it once had in Yarmouth.

just to individual preferences of a few farmers for handling this type of livestock.

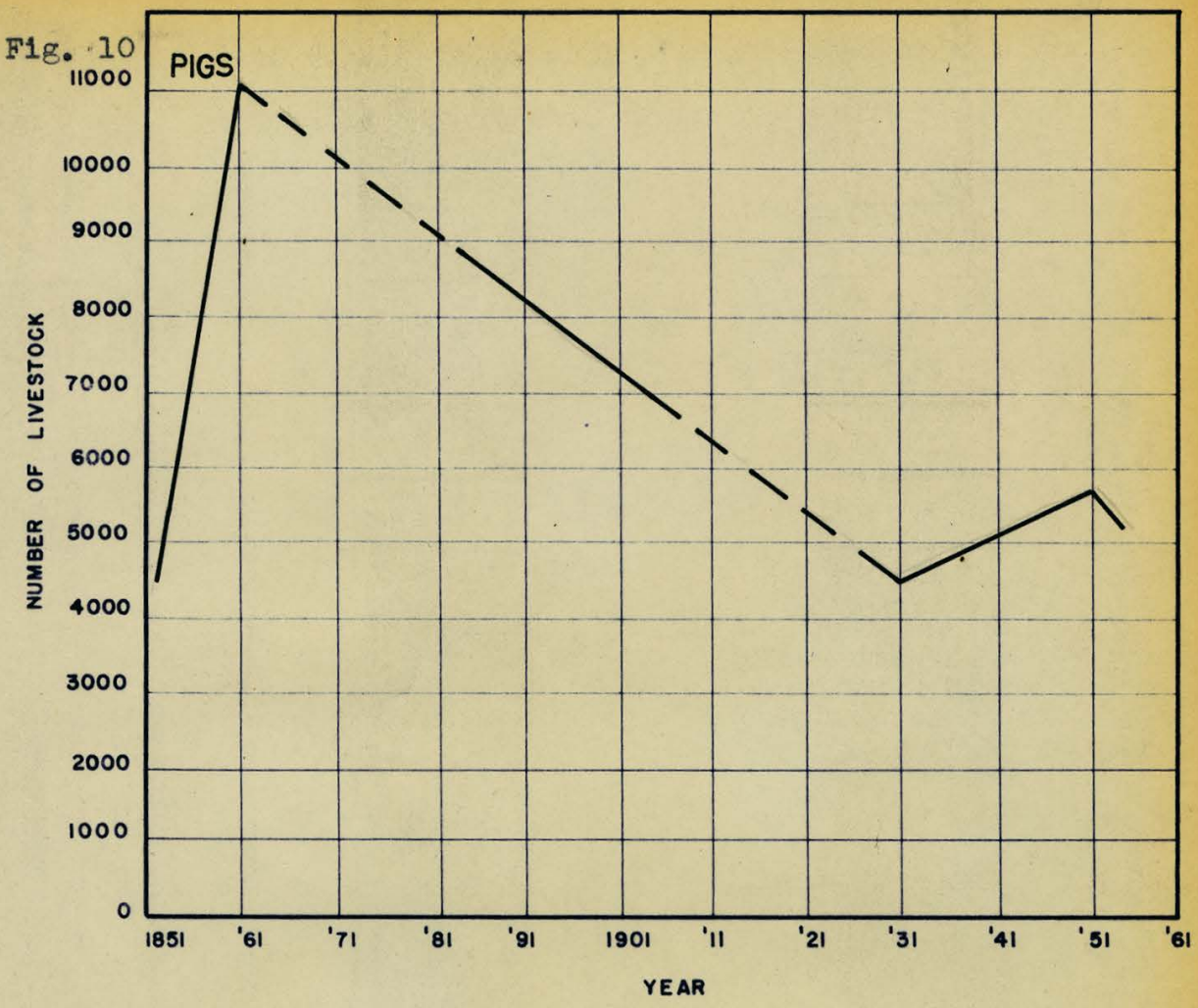
Pigs

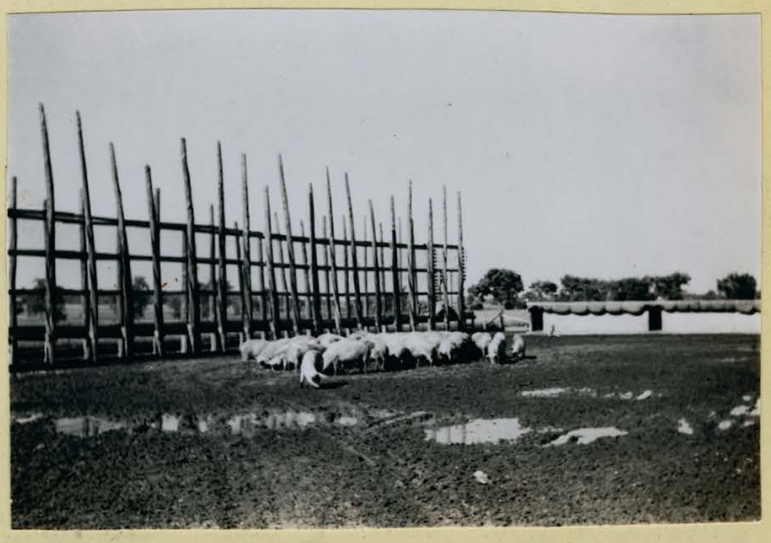
Historically there has also been a greater pig population in the past than there is today. Pigs declined steadily in numbers from 1851 to 1931 registering a slight increase during the 1940 and 1951 period, but dropping again in 1956.

The pig distribution map (Figure 11) indicates that there is a heavy concentration around Belmont and an especially heavy concentration in concessions 10 and 11 immediately west of Mapleton. These areas of heavy pig production are related closely to the dairy industry. The cheese factory at Mapleton supplies whey, which is an excellent pig food, free of charge to local farmers, and the Belmont dairy industry also has waste dairy products which are used by the surrounding farmers as feed. In addition, there are interesting gaps in the distribution of pigs which can in places be explained in terms of specific variables. For instance, there are no pigs in the tobacco area and in most of the potato-growing region because these crops need a good deal of attention. Also a higher price can be obtained for a crop such as potatoes than could be obtained if potatoes were fed to pigs and then the pig sold. In other places the gaps are explained in terms of individual preferences because some farmers just do not like working with pigs.

CENSUS RECORD OF LIVESTOCK

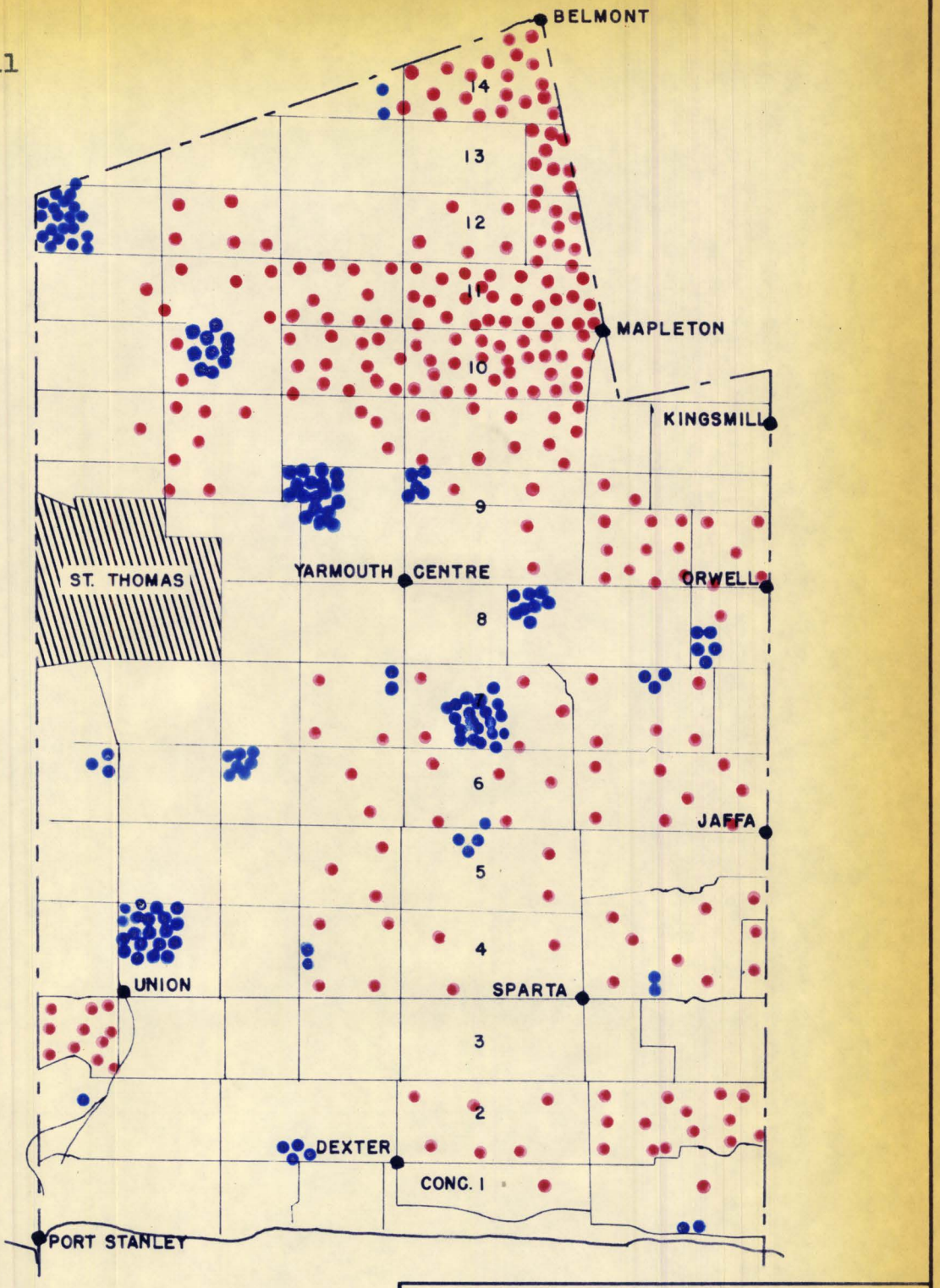
Fig. 10





Illus. 33 Pigs on the 40 acre farm of K. Taylor just off Highway 74 provide his only source of income.

Fig. 11


BELMONT
14
13
12
11
MAPLETON
10
KINGSMILL
9
ST. THOMAS
YARMOUTH CENTRE
ORWELL
8
7
6
JAFFA
5
4
UNION
SPARTA
3
2
DEXTER
CONC. I
PORT STANLEY
PIG & POULTRY DISTRIBUTION
SCALE 1/2 INCH TO 1 MILE
ST. THOMAS
10 PIGS
URBAN CENTRE
100 UNITS OF POULTRY
ROADS

The pigs go to Talbotville Royal in Dunwich to be sold through the Ontario Hog Producers Marketing Board. But their ultimate destination for packing is London and Toronto.

Poultry

The raising of chickens and turkeys is in most cases very specialized in Yarmouth. Two farms carry out the complete operation from growing the young bird to cleaning and packing and freezing it in preparation for retail sales. Other farmers maintain the birds for egg production and still others operate hatcheries to supply young birds to poultry farmers who grow them for meat production.

Mink

One mink farm is located on the third concession just south of Sparta. There is no specific physical reason why the farmer should have engaged in mink farming; he just felt that it was a profitable endeavour with a minimal amount of labour.

Horses

The horse population has declined drastically in the last thirty years with the advent of the tractor. Very few horses remain in Yarmouth and those that do are invariably associated with tobacco farming. Because tobacco is a row crop and grows quite high it is impossible to take a tractor into the field once the crop is mature. Nevertheless in harvesting only a few of the leaves are picked at any one

time and some means for hauling the large number of leaves from the fields is needed. The horse neatly fills this role because it can walk between the narrow rows of tobacco plants without damaging them and at the same time haul the narrow "sheds" containing the tobacco leaves. Usually there are two horses per farm and this would place the total horse population at a very low figure.

In summary, although there are many different types of livestock, they all take second place to dairy cattle. The most likely reason for this fact is that the climate of Yarmouth induces good pasture and hay yields which encourage the development of a livestock economy; and the price for bulk milk are higher than prices for meat or wool.

ASSESSED RURAL LAND VALUES

The county assessor evaluates a farm on the condition of the buildings. Within this technique lies the implicit understanding that there is a relationship between the type of soil, terrain, etc. and the prosperity enjoyed by the farmer.

The highest valued land is found near Jaffa and in the other tobacco regions in the south of the township. The high land values continue to a large extent northwards to the 6th concession. This is perhaps related to the fact that there are two sources of income, bulk milk sales from dairy herds and cash crops of corn, wheat, soy beans, etc.

The area with the next highest evaluation lies north of concession 6 and continues to the northern boundary of the township. There is a noticeable block also in the vicinity of Union on concession 3 because a tributary of Kettle Creek has eroded valleys into the well drained sand loams.

The second highest evaluation is located on the lacustrine and till plains and the St. Thomas moraine. Much of this area has a good income from dairy herds which supply milk for fluid milk sales in St. Thomas and for manufacture into cheese, ice cream and condensed milk in Mapleton, Belmont and Aylmer. In addition, there are cash crops such as wheat and corn and the raising of pigs to supplement the incomes of the less specialized farmers.

The areas of lowest farm values occur scattered throughout the study area but they occur most frequently in proximity to the badly eroded land associated with the two major creeks and their tributaries. The four areas of the very lowest value along the first concession are the sites of extensive gullies and in three cases out of the four they have been allowed to remain as forest or have been deliberately replanted with trees. For the rest of the township there is in many cases a close relationship between the watercourses of the creeks and the lowest value of land. In terms of economics this area is very unsuitable for agriculture and is becoming increasingly so after every major time of high water with its concommitant period of intensive erosive damage.

ST. THOMAS

PORT STANLEY

ASSESSED RURAL LAND VALUES PER ACRE

SCALE 1 INCH TO 1 MILE

- 0-20 DOLLARS
- 21-30 DOLLARS
- 31-40 DOLLARS
- 41 DOLLARS AND OVER
- URBAN ASSESSMENT

Map 7

Illus. 34 The best farmsteads in Yarmouth township are located in the tobacco growing regions.

Illus. 35 Farmsteads intermediate in value are often associated with dairy farming.

Illus. 36 The poorest farmsteads are often located on land badly eroded by the tributaries of the creeks.

CHAPTER IV

URBAN LAND USE

The initial settlers of Yarmouth were primarily interested in clearing the land in preparation for farming, but at the same time needed services that they were unable to provide for themselves. Gradually small nucleated settlements grew in response to these demands. Some continued to grow over the years and are today thriving cities, but others died or stagnated. In Yarmouth township there are a number of urban places which occur in different types of sites. These sites may be classified into three different categories: crossroads, railway crossings, and stream crossings.

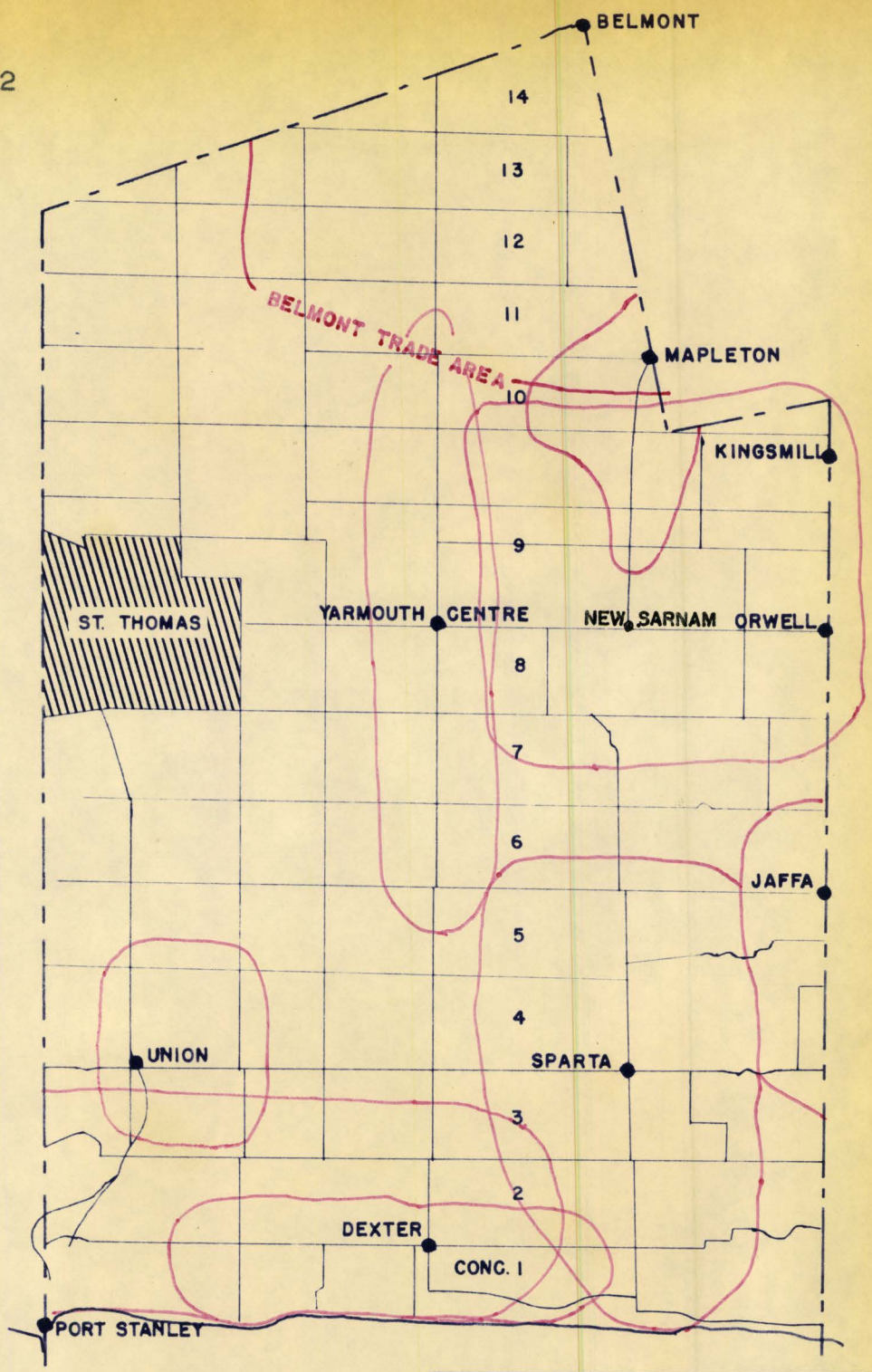
The first type refers to a settlement which occurs at a crossroad strategically located in terms of transport, the second is at a railway station near an important road and the last is where a stream makes contact with a transportation route. Some settlements show more than one of these characteristics but even with these the past activity of the community appears to have been related more to one factor than to the others. An attempt has been made here to assess these factors and to place each small settlement in one of the three categories.

CROSSROAD SETTLEMENTS

Mapleton

Mapleton came into being with the establishment of a

Fig. 12



TRADE AREAS

SCALE 1/2 INCH TO 1 MILE

ST. THOMAS

TRADE AREA

URBAN CENTRE

ROADS

cheese factory in the 1850's on the main road now called Highway 74. The Canadian Directory first mentions this settlement in 1869 and gives the population as 30 people. By 1871 it had risen to 70 and the services it provided had increased proportionally. In addition to the cheese factory it possessed a post office, a store, a shoemaker's shop and a hotel.

Today Mapleton is still small with a population of approximately 45 people. Highway 74 has been paved and serves as a major north-south travel route from settlements north of Belmont to Highway number three in the centre of the township. Highway 74 is still the basis for the economic existence of Mapleton because it brings both transient trade and regular customers from the surrounding countryside to the single grocery store. Figure 13 indicates the type of land use found including a repair garage and the cheese factory which are the remaining economic activities of the settlement. The garage depends upon the repair trade of the surrounding farms and upon repair work sent from as far away as St. Thomas. The reason that work from St. Thomas is sent so far is that the rates of the garage are very low due to extremely low overhead and due to the fact that the mechanics are themselves the co-owners of the establishment.

The cheese factory has had a very chequered career. It was based originally on the local market for cheese and its production fluctuated with local demand. In the early 1930's it became a co-operative with the local dairy farmers

sharing in the ownership, because prices fell sharply and even the larger dairies of the district were closing. During and after the second world war it enjoyed a very large volume of production due to the huge demand for powdered milk and cheese in Europe, but this phase of its economic history soon passed and the factory was closed completely in 1952 because there was no price support on cheese. In 1954 the plant was bought and its equipment improved by a local man and the City Dairy of St. Thomas. Now the cheese factory specializes completely in a smaller cheese (20 lbs.) than normally encountered in the trade. The factory holds a contract as the exclusive supplier for Dominion stores in Southwestern Ontario. It gets the bulk milk from the surrounding dairy farms as shown on Figure 6 . Labour for the enterprise is provided by the part owner who resides in Mapleton and by two employees who live in St. Thomas.

The rest of Mapleton's population works in either St. Thomas or London and merely uses the hamlet as a place in which to live. Although they do patronize the local store, they make their major purchases of groceries and other items in St. Thomas.

The institutional use of the land involves only a school and a cemetary.

Yarmouth Centre

This centre as its name indicates is at the geographical centre of Yarmouth township. It came into existence

Fig. 13

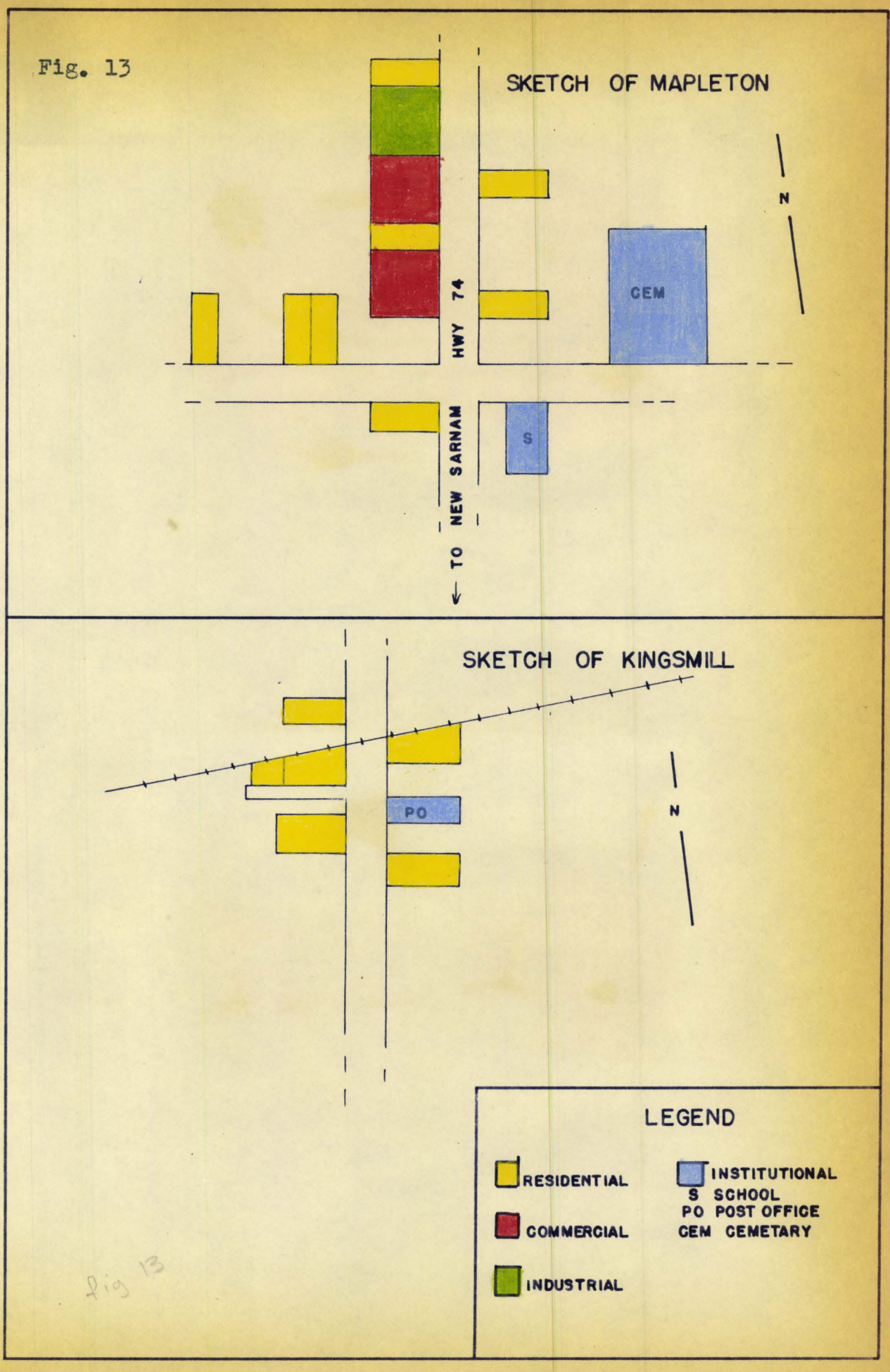

SKETCH OF MAPLETON
HWY 74
CEM
N
S
TO NEW SARNAM
SKETCH OF KINGSMILL
PO
N
LEGEND
RESIDENTIAL
COMMERCIAL
INDUSTRIAL
INSTITUTIONAL
S SCHOOL
PO POST OFFICE
CEM CEMETARY

fig 13

Illus. 37 The few buildings of Mapleton are clustered along Highway 74.

Illus. 38 Yarmouth Centre is at the intersection of Highway 3 and a township sideroad. The building in the right foreground is the former township office.

later than other places such as Mapleton, but it was deliberately located at the intersection of the most central sideroad and the very old Talbot road, which has since become Number 3 Highway, with the idea of becoming, in an economic and political sense, the centre of the township. In 1871 it had a population of 160 people who were employed in a cheese factory, a tannery, a hotel, a store and a post office and as a blacksmith and veterinary surgeon. By the early 1900's the settlement had acquired the administrative offices of the township and this led eventually to the location of a township fire department here. Eventually it lost its administrative function to St. Thomas and the old township office is no longer used, except on rare occasions: for some community gathering. Yarmouth Centre did not receive a railway station at first because St. Thomas became the railway centre for the township and the two places were in close proximity to each other. Therefore the financial aspirations of this hamlet came quickly to a close. Population has declined from the recorded high of 170 to less than 100 people in 1962. Today only two commercial enterprises remain: an automobile service and repair station, and a general store with a very narrow range of goods. Both cater to the holiday traffic consisting largely of American tourists who use Highway 3 to pass through southwestern Ontario on their way between the American mid-western states and Buffalo. In addition, the general store serves some of the needs of the rural population living on the

central side road (see Figure 12). The trade area is elongated north and south because of the very effective competition experienced from St. Thomas and New Sarnam to the east. Figure 14 shows that the old township offices and the fire department remain, a single church serves the spiritual needs for some of the inhabitants, and the rest of the buildings are residences inhabited by retired folk or by people who both work and shop in St. Thomas. Yarmouth Centre, therefore, is almost entirely under the domination of St. Thomas.

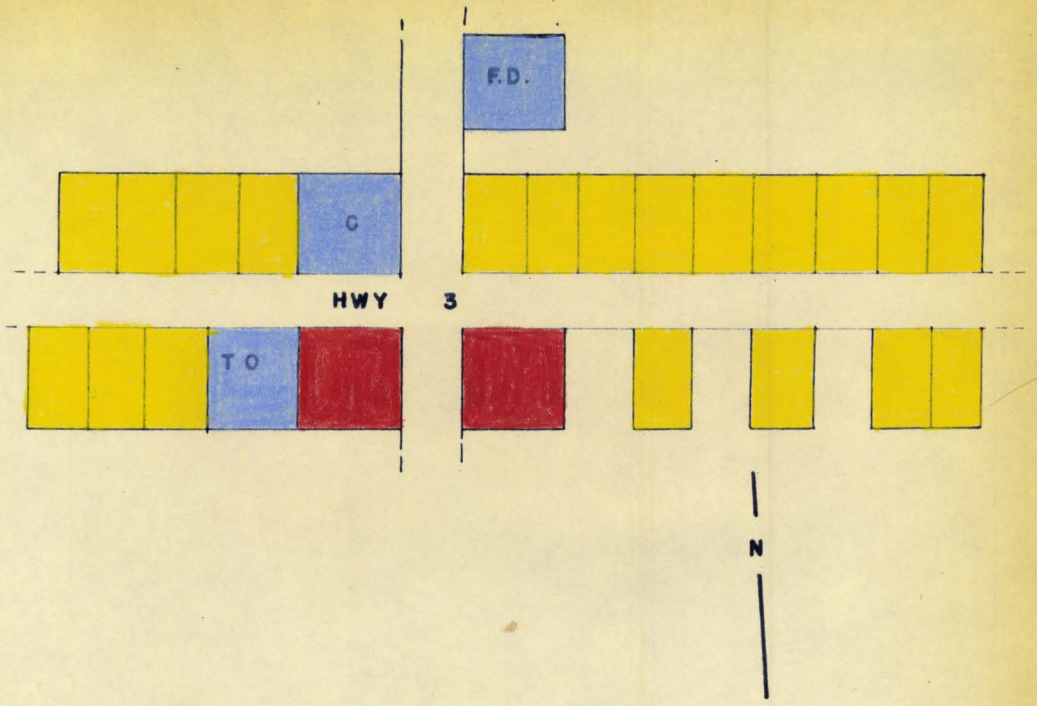
Jaffa

The Canadian Directory does not list Jaffa for any year, evidently because it is neither very important as a commercial centre nor very old as an urban place. This hamlet is located at the junction of two gravel roads in the heart of one of the tobacco growing regions. The fact that it serves tobacco growers may account for its recent establishment because this crop has only recently been introduced in the last 30 years into Yarmouth.

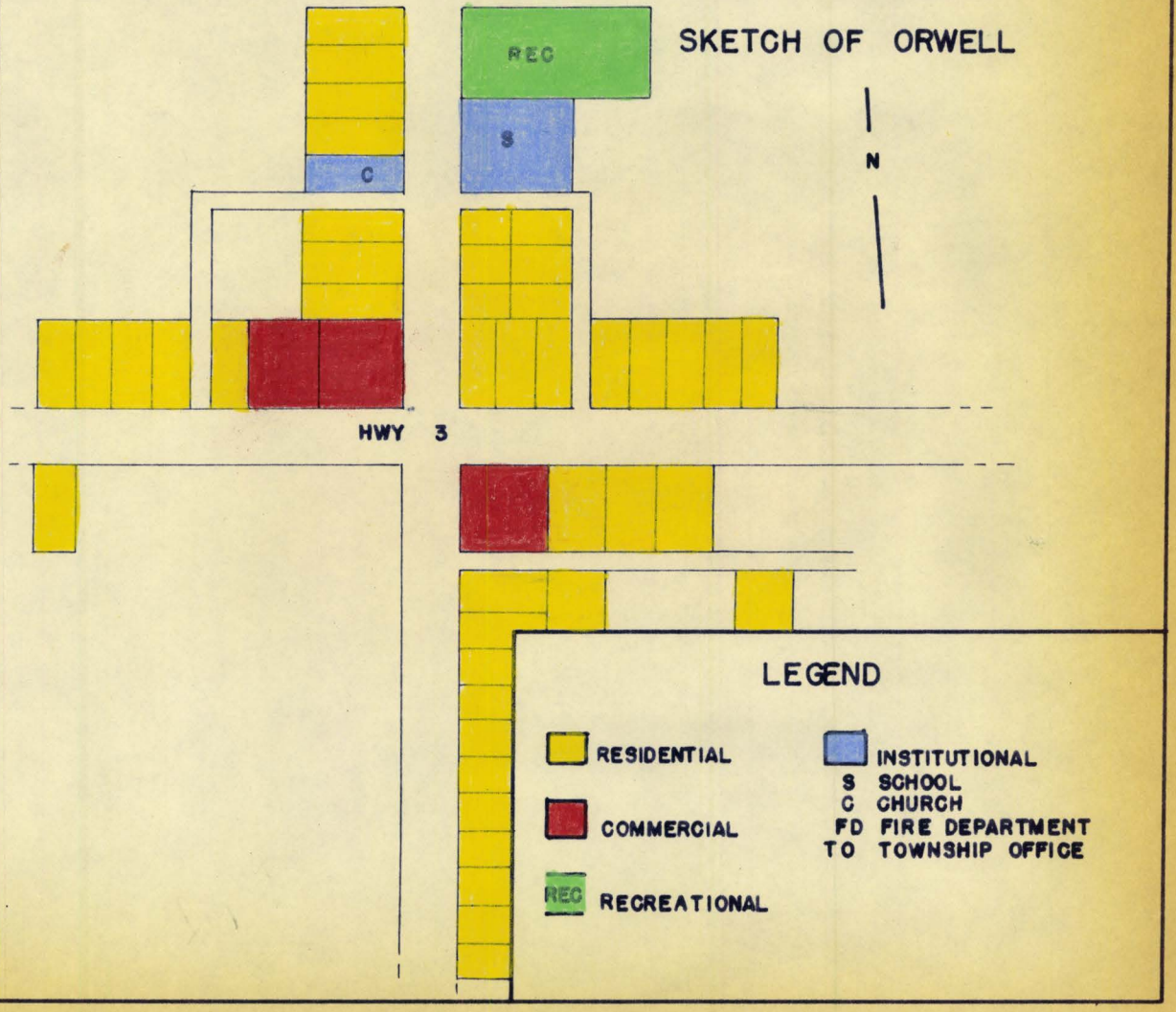
The land use sketch (Figure 17) shows that only a gasoline outlet and general store plus a rather large repair garage are located here. The general store with its gasoline pumps is located right on the corner whereas the garage is situated away from the corner on concession 5. Because tobacco regions are quite prosperous they often have much mechanical equipment. Therefore there is a large amount of work for the garage. Help is acquired locally

Fig. 14

SKETCH OF YARMOUTH CENTRE



SKETCH OF ORWELL



from the settlement itself although not all residents of Jaffa work in the vicinity. Some of the farmers have their homes in the hamlet because their land abuts the settlement. The small store does its largest trade in the summer when many farm labourers come to work in the tobacco fields. As shown in Figure 12 the area that the store serves coincides fairly well with the local tobacco growing region. However Jaffa is very small with a population of less than 50 persons and it will not likely become larger because people go to St. Thomas and Aylmer to do most of their shopping. But at the same time as long as tobacco farmers need hand labour the settlement will not decrease in size either.

Sparta

Sparta was established during the influx of Quakers into the southern part of Yarmouth very early in the settlement of the township. Illustration 18 is a picture of the site of their original meeting house and it is used even today. In 1857 Sparta had a population of 500 people and many types of hand industry such as cabinet making and broom making, as well as blacksmiths, lumber dealers, etc. By 1871 the population had decreased to 400 although its range of services had increased to include a small tin shop, a carriage shop and a cheese factory.

Sparta still maintains its agricultural service centre function. It has a very adequate agricultural implement servicing centre as well as two automobile repair

Fig. 15

SKETCH OF SPARTA

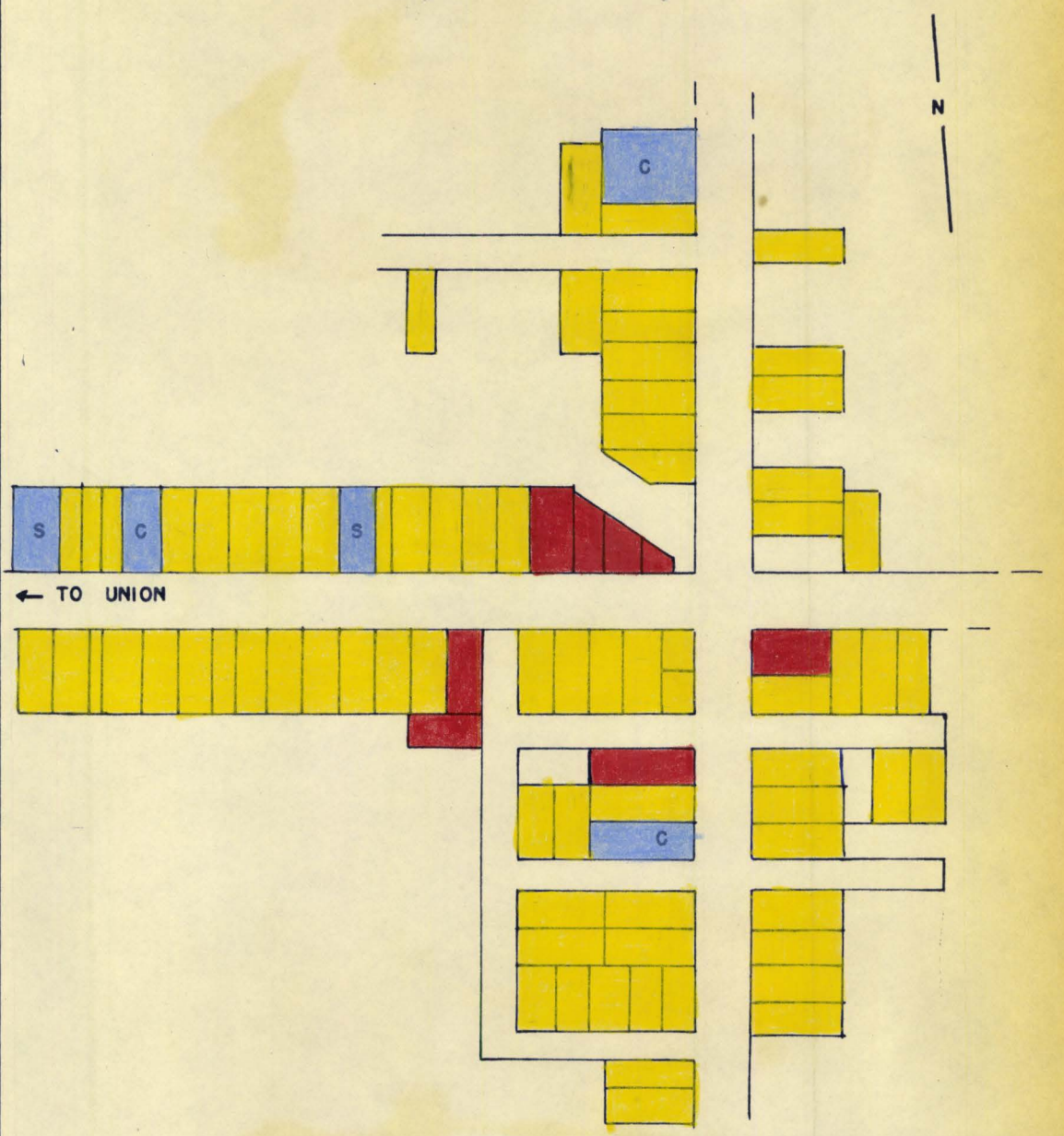


Fig 15

Illus. 39 The commercial enterprises in Sparta are located at the intersection of two paved roads.

Illus. 40 The former apple packing plants stand unused on the outskirts of Sparta.

and service garages. In addition there is a hardware and seed store that sells some of the seed needed by the local farmers.

Figure 12 illustrates the area served by the general store located right at the corner. The area is a fairly substantial one because it is situated some distance from St. Thomas and in fact lies between the Aylmer and St. Thomas trade areas. Another factor is that the general store has been operating continuously since the initial settlement and thus has been able to maintain very adequate stocks of goods which in turn help it to hold onto its custom.

Near Sparta are the ruins of an old apple packing plant used when fruit growing was at its height due to better markets. The plant was run by a former Mr. Mills whose descendents still maintain large apple orchards just on the outskirts of Sparta. There is no industry at all now in the village since this plant was abandoned.

Today the two roads passing through Sparta are paved and this has likely helped to maintain a high service status in spite of the rise of St. Thomas. The population is still high and it is increasing again because some newly formed families are building new homes or renovating old ones. In interviews people reported that they liked the small community atmosphere and the opportunity for their children to play in a healthy environment. Their education is also adequately provided for because there are two schools in

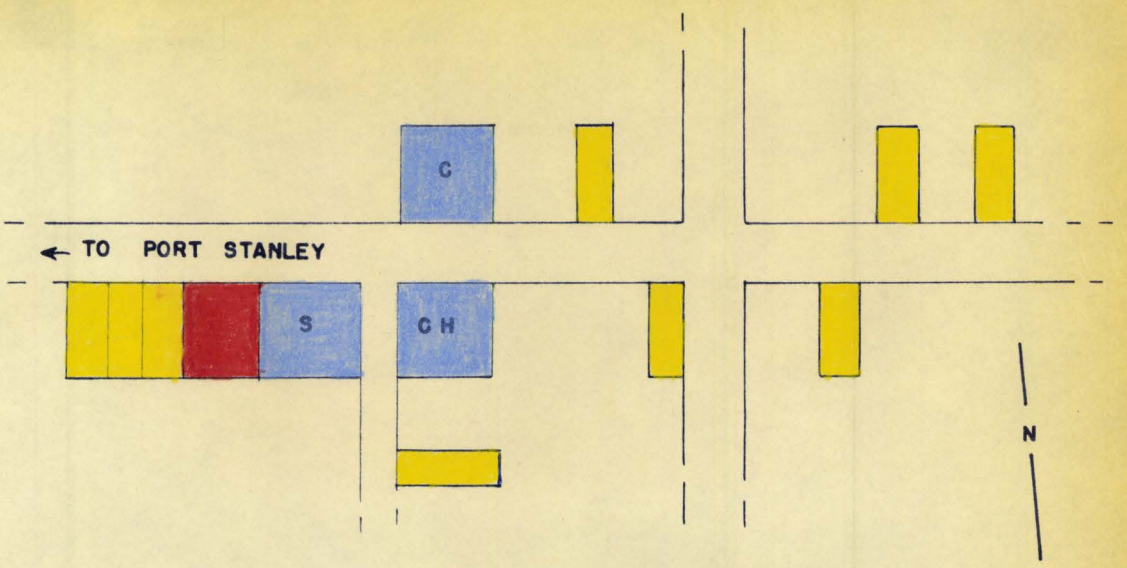
Sparta, one at primary level and a secondary school to grade 12. Some phases of the service function of Sparta are contracting, for example the single bank closed recently. But nevertheless as previously stated population is not declining and may actually show an increase in the future.

Dexter

Dexter was established early because of its location on the first concession, the main route from Port Stanley to Port Bruce, and by 1869 had a population of 250 people. A hotel with a post office was located at the main corner and the settlement was also an agricultural service centre with coopers, blacksmiths, etc. Today the main road has been paved and it is still a main route for traversing the township from east to west or vice versa. But the service function of Dexter has largely disappeared. With the rise of Port Stanley to the west Dexter's trade decreased. Little trace remains of the many shops and buildings and the hotel has been converted to a private residence. The trade area of Dexter is controlled by a single very small general and confectionary store. This trade area is fairly large because like Jaffa it serves the needs of migrant tobacco and potato farm workers who come in the early summer and remain through until mid-September. In addition there is, in summer, a fairly large transient trade from people on their way to picnics along the Lake Erie shore bluffs. Gradually Dexter is disappearing as a centre

Fig. 16

SKETCH OF DEXTER



SKETCH OF UNION

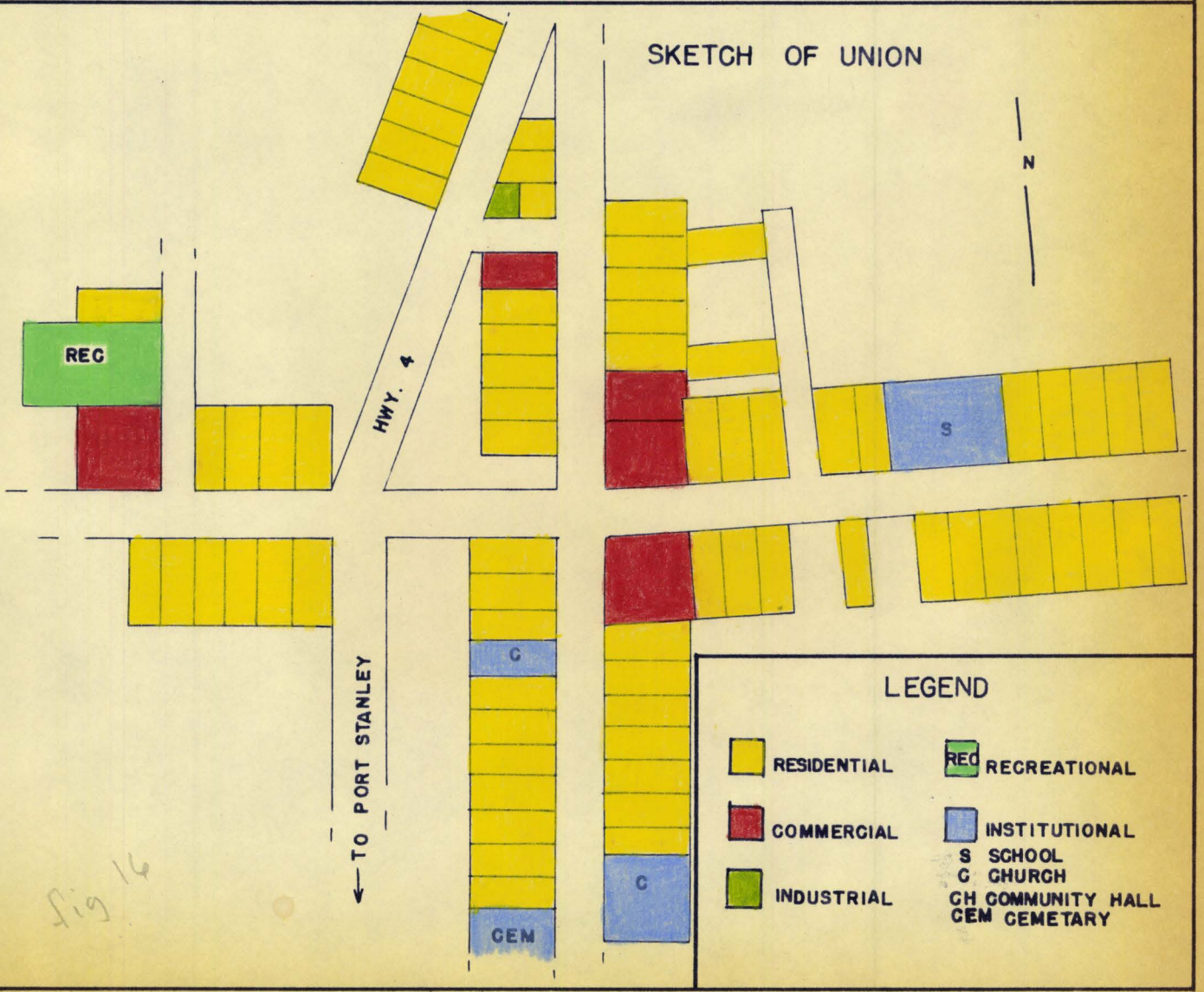


fig 16

as people tend to move to places like Port Stanley where cottages for all-year housing are available and inexpensive. But still Dexter is held together by its function as an educational, religious, and community centre.

RAILWAY SITE SETTLEMENTS

Kingsmill

Kingsmill was built around a steam-powered flour mill, established beside the railway. The finished products were shipped out by railway, and the mill provided employment for local people who settled here. Gradually a small community was established and it possessed two hotels which quenched the thirst of farmers waiting with their wagon loads of grain for the mill. Stockyards and a general store rounded out the commercial establishments of the settlement. Later the mill went out of business and the economic viability of Kingsmill came to an end. Today it only continues its function as a post office, all other forms of business having long since died. Only six families continue to live here and two out of the six are farm people whose land abuts the hamlet. The others gain their livelihood in St. Thomas or Aylmer.

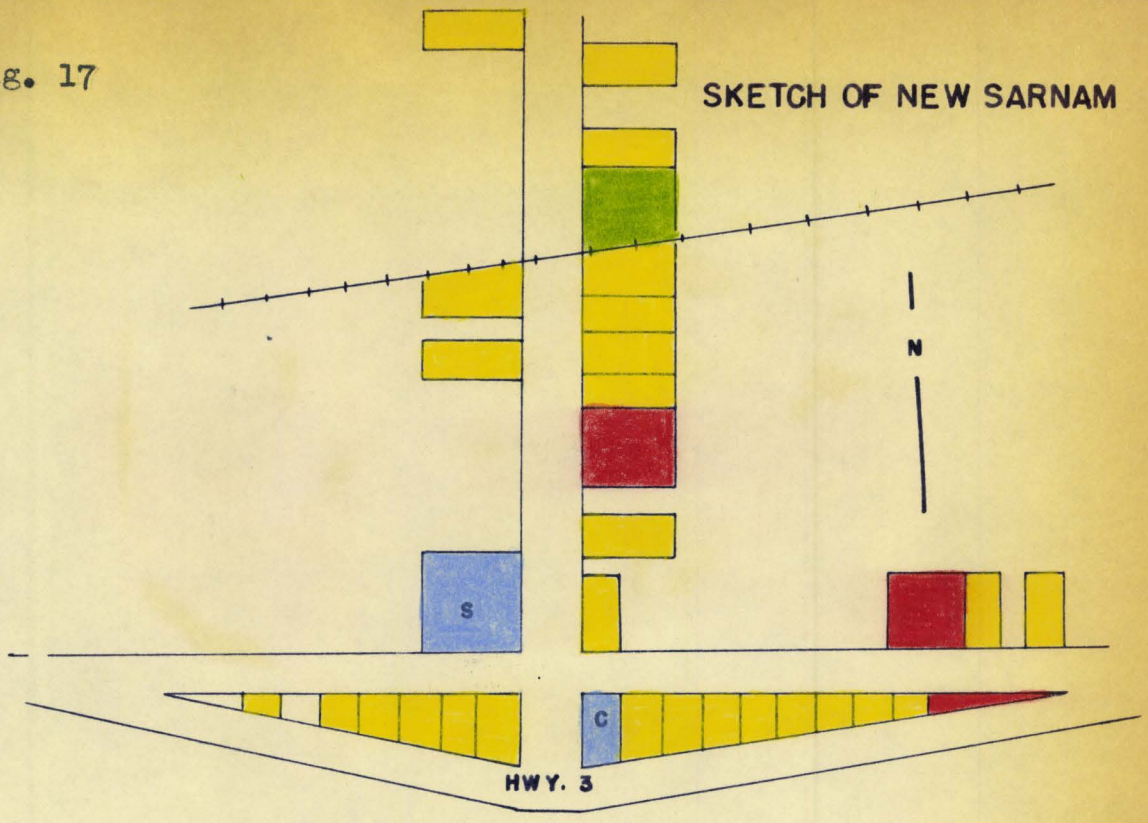
New Sarnam

The Canadian Directory referred to this settlement in 1857 as a station located on the Canada Southern Railway which was established in 1850. At this time it was very small with about 50 people. Railways were looked upon as a

means for quickening the economic pulse of any area no matter how remote. Therefore people invested money in any area which possessed a railway station and New Sarnam was no exception. Businesses were established and residential lots laid out. By 1869 population had increased to 200 but only a single industrial enterprise developed, that of broom making. But soon business activity declined; two years later the population was only about 150 people.

At the present time the railway no longer has a station here. A population of about 80 people are employed to a great extent in St. Thomas and London although a few work in the two gasoline stations, the restaurant and the general store. The business section has shifted from its old location on Highway 74 near the railway tracks closer to the intersection and onto highway 3 itself, because the main trade is gained as in Yarmouth Centre and Orwell, from the travellers using Highway 3. However a highway bypass was completed in the summer of 1962. This means that the single remaining economic resource, tourist trade, will be encouraged to pass by rather than through the hamlet. However population may hold steady or even increase in numbers because new housing has been built along Highway 74 by people who are working in London and St. Thomas because of the fine transportational routes offered by Highways 74 and 3 to these centres.

Fig. 17


SKETCH OF NEW SARNAM
N
S
C
HWY. 3

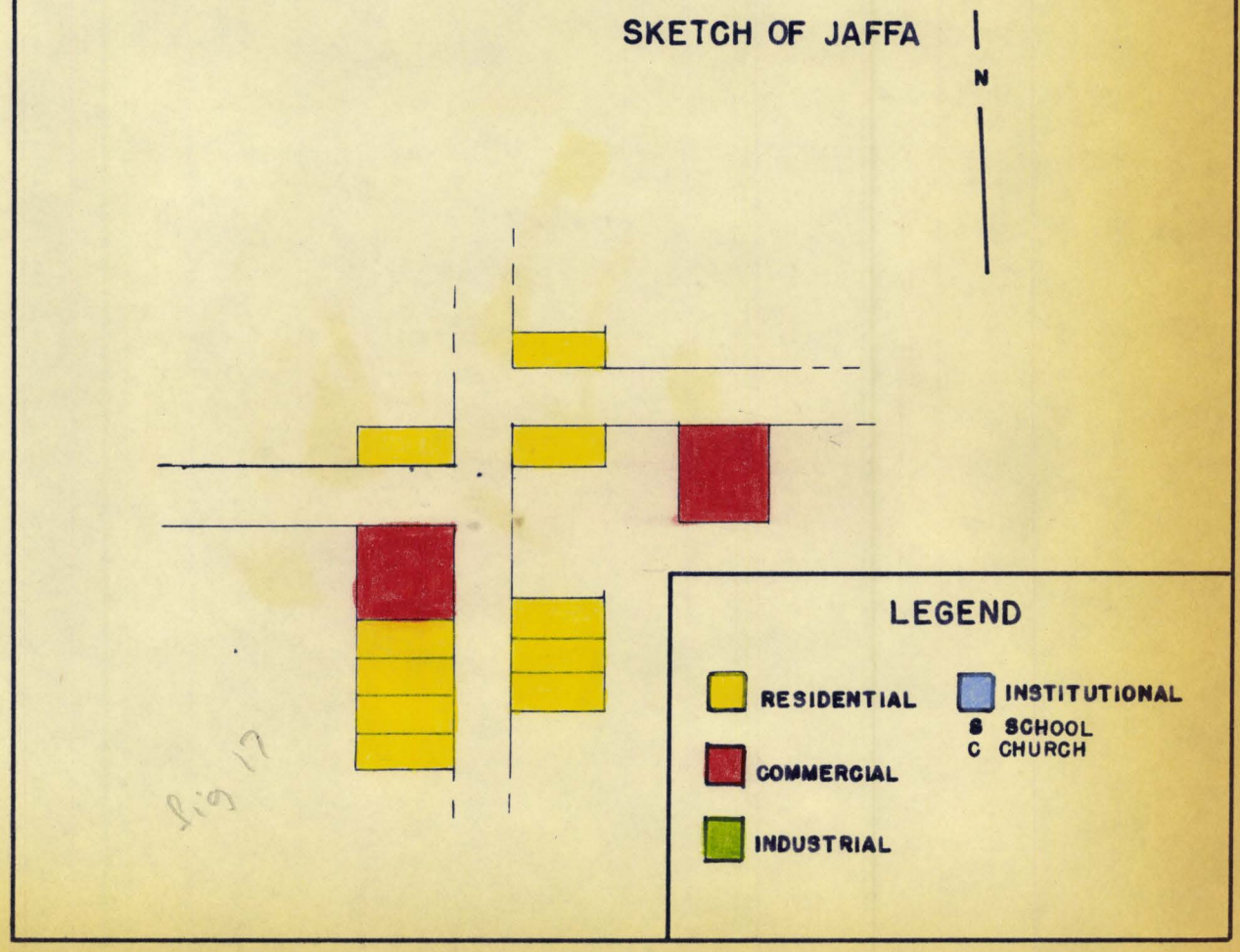

SKETCH OF JAFFA
N
LEGEND
RESIDENTIAL
INSTITUTIONAL
S SCHOOL
C CHURCH
COMMERCIAL
INDUSTRIAL

fig 17

Illus. 41 The hamlet of New Sarnam located at the junction of the old highway 3 and Highway 74.

Illus. 42 New housing is being built along Highway 74 in New Sarnam.

CREEK SITE SETTLEMENTS

Belmont

Belmont was originally established as a millsite for a grist mill. The small creek that divides the village into two parts was the source of energy for powering this milling industry. It was not the existence of the creek alone that favoured the location of the settlement but rather the fact that the stream crossed a major north-south travel route. The village grew quickly in the 1850's from 250 people in 1857 to 400 people by 1869. The reason for this growth was that the railway established a station here in the 1850's. Yet at this level the town stagnated in its growth because of the increasing emphasis on automotive transportation, so that today the population stands at about 630 people. Most of the original industry is, of course, gone although it has left its mark on the type of services now provided in Belmont.

Today Belmont is primarily an agricultural service centre with the Elgin Middlesex Farmers Company Ltd. which manufactures and provides animal feeds and farmers supplies, the Blancher Egg Transport Company Ltd., two farm implement sales and service depots, and the Borden's Company Ltd. There are also commercial outlets that provide shopping, insurance and banking facilities. The land use sketch of Belmont (Figure 18) indicates the disposition of these services in the village, with the main retail centres and the bank located on the paved two-lane number 74 highway which

is also the main street of Belmont and with the industry located beside the railway tracks. Most residential areas are located on streets running off the main highway although some homes are right on the main street. In each case land use is well suited to the site. The commercial section is on the main road because of the volume of traffic both local and transient. There are two distinct commercial nuclei because the town is split in half by a creek which likely acted as a barrier in the past. Industry is located near the railway tracks because of the ease of shipping or receiving goods, and the residential areas are located away from both the railway and the highway because people desire a quiet and pleasant place in which to live.

Belmont also offers a wide range of institutional services ranging from a post office to a public library.

Borden's Ice Cream factory has located at Belmont because the surrounding area is a good source of milk. In addition it is necessary for a plant utilizing milk as its as its raw material to be close to its source of supply because the farmer must pay 24 cents per hundred weight for every 25 miles hauled. With the price of bulk milk for manufactured products at $2.81 per hundred it is easy to see that no farmer could afford to ship very far. Milk is made into ice cream, peak production during the summer months coming conveniently at a time when milk production is at its highest. However a large amount of seasonal labour is needed and much of this is obtained in Belmont as well as in

St. Thomas.

The trade area of Belmont extends beyond the limits of Yarmouth township but also covers the north-east part of the area. Some businesses have located here because they feel that they are far enough away from St. Thomas and Aylmer to be able to compete locally with them. The Belmont lumber company is located here, in the words of the proprietor, solely in terms of market potential. This business is located near to the railway tracks so that if it ever gets big enough to warrant having its materials shipped in by train it will do so. The highway also provides transient trade for local businesses as well as making it easy for local farmers to travel to Belmont. Belmont is also the home of contractors who do their work all over the township as well as in the adjoining townships.

In summary, there were at least three major factors in the development of Belmont as a service centre: the creek, the railway and the paved highway, and its distance from other service centres. The first factor has been stressed because it was the original reason for establishing industry and service functions here.

Orwell

Because the Talbot road was the route into Yarmouth township many settlements grew up along it. Stage coaches helped to develop settlements that were one day's coach journey apart. At first glance the development of Orwell appears to be more tightly linked with the road and stage

Fig. 18

SKETCH OF BELMONT

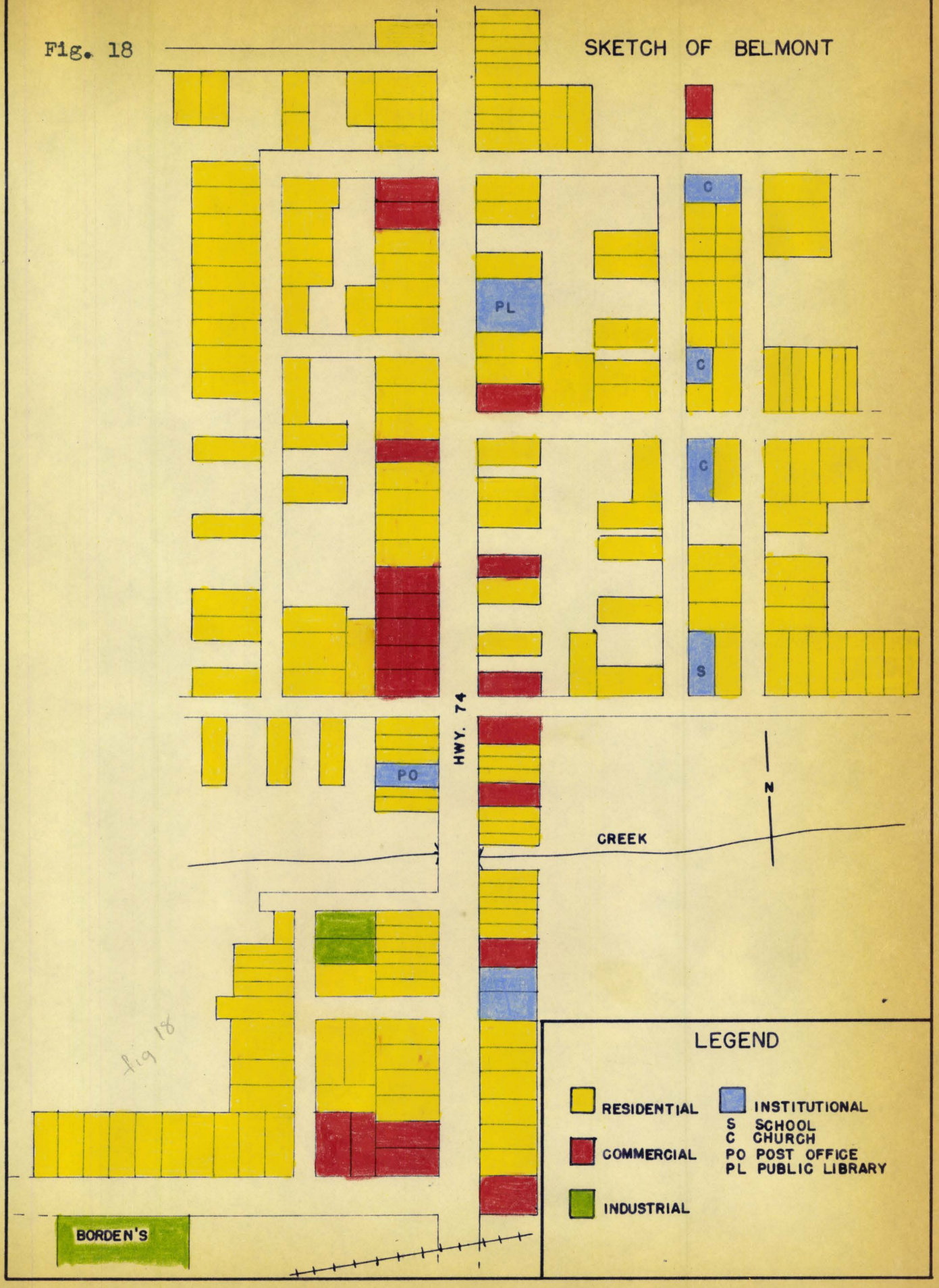


fig 18

Illus. 43 The main street of Belmont is Highway 74.

Illus. 44 Borden's ice cream plant in Belmont uses the bulk milk from the surrounding dairying region as its raw material.

coach traffic than the local creek, but such is not likely the case because Orwell is less than even half a day's coach journey from St. Thomas and Aylmer.

In 1857 Orwell had a population of 300 which was engaged primarily in manufacturing using the local wood and leather products for raw material and the stream for power. There were harness makers, sleigh and carriage makers, match makers, shoe makers, etc. In 1869 there were a number of saw and planing mills set up on the stream and population was holding steady rather than increasing or declining. Yet today no industry is located here and the number of occupants has declined to about 150. The only commercial establishments are a farm machinery sales and service outlet, a hardware store and a combination gas station-restaurant. No trade area is designated for Orwell because to compare the relative importance of the urban places only the trade areas of general stores was plotted, and Orwell has no general store or anything comparable to it. However the gas station and restaurant on Highway 3 do a good deal of business. Belmont is much like Yarmouth Centre in its service function then. The hardware store also carries a large range of heating equipment which are sold throughout much of the southern part of the township, but this is of such a specialized nature it hardly reflects the importance of Orwell as a trade centre, nor does it employ many people locally. Really it appears that the hardware store has moved from St. Thomas to escape high overhead and to be away from competition

for the local rural custom.

A fairly large number of people have continued to live here because, via the excellent highway, St. Thomas is only a few minutes away by car. These people have built a fine new school to educate their children and have all of the amenities of a large city only a few minutes from their doorways without suffering any of the drawbacks of high tax assessments etc.

Union

By 1857 the London and Port Stanley railway had established a branch line to this thriving settlement, to bring raw materials and remove finished goods from its grist and flour mill, its woolen mill, its distilleries, its apple evaporators, and its other industries. All of these plants had been established much earlier on the local stream where it crossed the toll road from Port Stanley to St. Thomas. They obtained wool from local sheep, fruit and wheat from the recently cleared fields, and at this period the settlement was obviously thriving with a population of 300. But as time passed it was evident that Union was stagnating. Once there was a switch to other forms of industrial fuel Union's initial advantage was lost. Because industry did not grow it became unprofitable to operate the railway spur and it was therefore discontinued in 1917. Fortunately the toll road had earlier been paved and made into a public highway, and this route has become the life-line of Union's economy. Even it is threatened because

Illus. 45 Orwell is located on Highway 3.

Illus. 46 Service establishments are limited in Union, consisting of the two stores shown, and a number of gasoline stations.

recently a by-pass was created on number 4 highway to route traffic around the settlement. Nevertheless population has remained at over 500 people because although they work in St. Thomas and London they can easily drive to these places and are thus able to remain living here. In some sections a small amount of new construction is evident, indicating that some families intend to remain here and others are moving into the area from more densely settled urban centres.

Trade is limited to the immediate environs of Union and is mostly of a very simple type with a grocery and hardware store the primary retail outlets. There are a number of gasoline outlets and automobile repair centres which have changed over their original function as smithies. These stations originally served transient highway trade so that today they exist on less extensive means. However one automobile body repair shop has just located here in a new garage because it receives its business from St. Thomas.

Union is like Orwell in that it has built a beautiful new primary school which seems to lead one to the conclusion that local people feel that their community has a future as a dormitory town.

Port Stanley

Even as early as the beginning of the nineteenth century people such as Talbot and Bostwick saw the potential of Port Stanley as a major lake port because of the natural protection afforded in the mouth of Kettle Creek. With the signing of the Rush-Bagot Treaty in 1817 many small villages

Illus. 47 Ruins of an old woolen mill at Union.

Illus. 48 The business centre of Port Stanley is located on Bridge Street.

such as Port Stanley sprang into existence because now the lakeshore areas were free from the fear of armed agression. By 1827 a pier was built into Lake Erie to handle the ever increasing amount of shipping and by 1833 Port Stanley had become the chief port of the London district. Because it was a thriving area the London and Port Stanley Railway Company was created in 1856 to serve the district's transportational needs. Industry grew at a rapid pace, using raw materials entering and leaving the port, and Kettle Creek for power. Indeed, a whole industrial suburb was built immediately north of the port itself and named Sebourne. Small lake boats were built at Port Stanley and they began to ply back and forth across Lake Erie between the lake ports of Ohio and Port Stanley bringing coal and package freight and sending fish. At the same time the area gradually grew into an important recreation centre with tourists arriving by ferry from the United States. Hotels were built on the high bluffs surrounding the flood plain of Kettle Creek and along the sandy shore itself. Hotels and cottages spring up for those that were able to afford to take the train from London and spend a week or so here.

A number of things happened to detract from Port Stanley's potentially brilliant future. A much larger township was split into two, Yarmouth and Dunwich. Unfortunately this divided Port Stanley between the two townships which meant that it was probably difficult to get both to agree to economic policies which might favour one more than

the other. More importantly, as the years passed there was less and less emphasis on boat traffic and an increasing emphasis on rail and truck traffic. In any case Port Stanley's business fell off, as railways running westward from places such as Toronto and Hamilton began to capture the trade of London, St. Thomas, and much of Port Stanley's hinterland.

The tourist trade began to decline also. When tourists were forced to take the train or boat they were landed at specific centres which meant that such places were almost guaranteed large volumes of people, but initially, when they could use their own private motor vehicles they could go anywhere they wished. This meant that people were spread over a wide area and consequently no one place could depend upon the tourist trade to the degree that it might once have. Another factor in the decline of Port Stanley was that even bulk shipments were beginning to be handled by the cheaper more maneuverable gasoline and diesel trucks. Lastly the fishing industry has declined drastically in recent years due to both pollution of Lake Erie and more importantly by the lamprey eel which has been killing fish in large numbers.

Despite these problems, census figures show that Port Stanley's population still continued to increase throughout the entire history of the town. Therefore although it never achieved its expected heights as a lake port it has not declined appreciably from its original importance as a local

service centre and a place in which to live.

Today Port Stanley is regaining some of its importance as a tourist centre in spite of the rundown condition of its facilities because people are able to motor from St. Thomas and London very inexpensively. There is also a slightly increased amount of boat traffic carrying bulk cargoes of gasoline and coal, the Sterling Fuel Company having established coal yards, and the Cities Service Oil Company having established oil storage tanks in the harbour. These fuel supplies are sent to St. Thomas and London by both train and tanker transport.

Figure 19 shows that most of the industrial area is located in the harbour and on the flood plain of the Kettle Creek Valley where access to cheap transport is excellent. In addition to the fuel storage areas there are two small fish processing plants that clean and pack the fish for marketing both in Ontario and in the United States.

The rest of the flood plain further away from the creek is given over to commercial and residential use. The commercial section is on Bridge Street where a bridge has been established over the creek. There is a full range of facilities including grocery stores, a bank, a dry cleaners, hotels, barber shop, hardware store, restaurants, service stations, etc. The land use map also shows that there are residential areas immediately beyond the central business district and cottages at the periphery of the city in the vicinity of the lake. Some of the cottages are located on

Illus. 49 The industrial section is located in the harbour at the mouth of Kettle Creek.

Illus. 50 Tourist cottages are located along the fine sandy beach in Port Stanley.

Illus. 51 An amusement part is one of the attractions at the beach on Port Stanley.

Illus. 52 Boating is a favorite past-time and docking and servicing facilities are available along the shores of Kettle Creek.

SOUTHWOLD

YARMOUTH

LOT 15
RANGE 1 N. OF
LAKE ROAD

LOT 16

LOT 15
RANGE 1 S. OF LAKE ROAD

ORIGINAL LOT 16

CLERGY RESERVE LOT D

LAKE ERIE

HARBOUR

LAND USE SKETCH OF
PORT STANLEY

- RESIDENTIAL
- SUMMER COTTAGES
- COMMERCIAL
- INDUSTRIAL
- INSTITUTIONAL

higher ground which is the top of the shore bluff to the west and the bed of an old tributary which forms a sort of shelf or terrace above the Erie shore bluff to the east. Other cottages are located on the very fine clean sand beach to the west of the piers. Swimming, sun bathing and boating are common around this beach and shore area. There is also an amusement park which includes hot dog stands, a bowling alley, a dance hall and various "rides" for children. Some of the cottages on the high ground have been winterized and serve as permanent residences. This helps to explain why Port Stanley has experienced an increase in population. It is becoming more and more a dormitory town for people who work in St. Thomas.

St. Thomas

St. Thomas is the major urban centre in Yarmouth and as such dominates the rest of the township. Because this centre constitutes a study in itself only a brief description is given. The city was sited here because it was at the head of navigation on Kettle Creek. The original founder of the city had established himself here before the Talbot road was surveyed. A grist mill was built utilizing the water power of Kettle Creek and farming began in earnest. But as soon as the Talbot road came into existence its potential was realized as a means of directing population into the area near the creek. The original inhabitants of the site of St. Thomas decided to create commercial lots on the margin of their property that abutted the Talbot road and

this became the nucleus of the business section of the future city.

From the beginning of the nineteenth century the growth of the city was probably related more to the fact that it had quickly gained the function of administrative centre for the whole of Elgin County, than to any other factor. It was only later when London was finally established as a regional capital that St. Thomas was overshadowed by any other city in the area. When St. Thomas became the Elgin County seat it was able to attract the railway to it which encouraged its growth. The city's position was further enhanced in Yarmouth when the township offices moved from Yarmouth Centre to St. Thomas.

Industry, including milling and iron working, was attracted to the city from the first because of the availabilities of water power and good cheap transport by small boat down the creek. Later, railways ensured that St. Thomas would have good connections with its hinterland and its main port facilities further south at Port Stanley.

Secondary industries such as shoe manufacturing and stationery printing are accompanied today by the occasional primary industry such as an iron foundry using scrap as its raw material and the quarrying, cleaning and grading of sand and gravel. There is further secondary industry, such as dairies and bakeries, based on food production, raw materials being obtained from the surrounding countryside.

The original commercial centre on the Talbot road

at the edge of the creek has continued to grow and to spread eastward along this road because it was blocked by the creek to the west. Almost every type of service is offered that one would normally find in a city of over 20,000 population, and the daily newspaper, the St. Thomas Times Journal, advertises these services to the rest of the township. The newspaper helps to ensure that St. Thomas will be able to retain its economic hold on the rest of the township because it carries local news that would be of interest mostly to people living within the area.

The trade area of the city is related largely to the township since the newspaper does not have much interest for people living very far outside of Yarmouth. Good transportation via paved roads and good secondary gravel roads helps to speed people to St. Thomas's commercial section. A further inducement to do business in St. Thomas rather than in London or Aylmer lies in the fact that all business having a direct relationship with the township, such as the paying of taxes, etc. may be done in this city. Thus people will do all their shopping in St. Thomas at the same time. But this factor has less influence on the west central part of Yarmouth because Aylmer is closer than St. Thomas and so business is partly conducted there too. However generally St. Thomas is able to effectively control in a commercial and administrative sense the whole of Yarmouth township.

CHAPTER V

CONCLUSION

The foregoing chapters have been an attempt to describe what is actually encountered in a survey of Yarmouth township. But underlying the description there is still the question of why should the land use pattern take this particular form? There are other causes to be sure, but one of the major ones is the physical foundation upon which the use of the land is based. The conclusion will be an evaluation of its effect.

Physical geography helps to explain the siting of the various industrial uses of the rural land throughout the township because the old beach gravels and kame deposits are now quarried for road building and as the raw materials for industry in St. Thomas. In one case the recreational use of the land is directly related to the presence of fine sand in proximity to Lake Erie. This is the basis for much of the summer revenue obtained in Port Stanley. In another case golf links have been created upon low grade agricultural land found along the valley of Kettle Creek and on the St. Thomas moraine in the north of the township.

Urban land use has already been classified under three headings pertaining to their site. Nevertheless it is important to realize that although man has specific aims which he wishes to achieve he is still limited to a certain extent by the physical environment. Therefore if a mill

was to be erected in the past, both a good surrounding wheat growing region to supply the raw material and water for power were needed. By the same token the physical terrain affected where the transportational routes were placed. The Talbot road was very popular with the original settlers who had to walk great distances because it was located in the flat lacustrine plain and was therefore a very level road. This popularity of the road in turn encouraged the development of service centres at certain intervals along it. Yarmouth Centre, New Sarnam and Orwell were all at some time in their history related to this fact.

Even the road pattern itself is affected by the physical terrain. The original surveys depict an even grid of roads in Yarmouth township but in reality this pattern was only partially achieved. In many places the level land is so dissected by deep stream valleys that some of the sideroads were just not built. In other places the main paved road, in part Highway 74, running from Belmont to the first concession jogs in a series of right angle bends, such as that in the 8th concession, because to continue it in a straight line would have meant building a series of bridges over tributaries of Catfish Creek. The railroad pattern is no exception with the rail lines carefully skirting the moraines to both the north and south of Highway 3 and utilizing the lacustrine plain. Because the railroad was encouraged to build its routes on the flat terrain, settlements such as Kingsmill and New Sarnam are located on

the lacustrine plain rather than elsewhere.

Agricultural patterns are, if anything, more tightly bound by the physical variables because it is upon these that it ultimately depends in spite of crop prices, distance from markets, etc. Specific crops occurred in distinct areas because in some cases the climate was moderated by things such as high ground with good air drainage or by proximity to Lake Erie. The size of the farm appears to limit the type of activity. If a farm is big a farmer may engage in general, mixed farming or he may specialize. But this opportunity of coice is denied to the farmer with limited holdings because to enjoy a fair standard of living specialization must be affected. Examples of this were some of the poultry farmers and one man on Highway 74 who possessed 40 acres which was given over entirely to corn production to feed his single source of income, pigs.

The glacial activity in past times developed certain types of deposits which in turn lead to the development of distinctive types of soils. For example the deltaic sands associated with the older Kettle and Catfish creeks draining into glacial lake Warren have become the core areas of a tobacco growing region and the northern St. Thomas moraine now supports an excellent growth of pasture and grains because of the soils. Therefore physical determinants affect the prosperity of the individual farms. (Map 7) The highest valued farms occur to a large extent in the tobacco growing regions whereas the lower farm values are associated

in most cases with the dissected and eroded terrain in the creek valleys. The farms north of concession 6 located on the lacustrine plain, till plain, and the St. Thomas moraine are evalued at the second highest level because these areas produce good cash crops of wheat, soy beans, corn and milk. The farm values are computed by the county assessor on the general appearance of the farm buildings and Illustrations 34, 35 and 36 indicate the correlation between type of farm land and its value as shown by farm buildings. There appears to be agricultural regions although general farming predominates in area used for this purpose. The most re-numerative type of farming is tobacco growing and the least as shown by the rural land value map is the general farming in the vicinity of the creeks.

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